The EU-China search for common language for green bonds

- a realistic and influential path?

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Tiivistelmä – Referat – Abstract

EU-China search for common understanding on what activities should be considered “green” and eligible for financing by green bonds started recently. Common understanding could, according to negotiation parties, facilitate greater cross-border flow of green finance. As China and EU together lead the global green bond market, a common understanding could even enhance much sought after harmonization of green bond rules at global level.

This study examines how realistic and influential the search mission for common EU-China green bond language is, filling gap in research on green bonds in the EU-China context. Analysis is based on multimethod approach combining qualitative standard comparison, interviews and media analysis. The work is carried out applying a liberal two level game approach (Putnam, 1988), from the field of International Political Economy, which has proved useful when analysing domestic-international dynamics present in international negotiations on e.g. energy, climate and environmental policy.

Based on the analysis, where China balances with fear of slowing economy, growing energy demand and urgency to fight pollution, the EU can already afford to focus on the climate change combat. This difference is reflected, based on the analysis, in the regulations the two regions have recently developed for green bonds. With preferences not aligning, it may prove difficult to find aligning views on the types of projects eligible for green bond financing. This means that the domestic win sets (Putnam, 1988) of the two regions don´t currently overlap implying that a common EU-China agreement on green bond rules may at the moment be impossible. However, even with a fully aligning views on green bond definitions and rules, the cross-border green finance between the EU and China would likely not increase significantly as there are other market barriers that hinder the flow at present. Nevertheless, having the EU-China dialogue was still viewed to enhance climate change cooperation and raise awareness.

Avainsanat – Nyckelord – Keywords
China, EU, Green Bonds, Standards, Green Finance, International Political Economy, Multimethod research, Two Level Game Approach

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Muita tietoja – Övriga uppgifter – Additional information

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1 Introduction

Green bonds mobilize capital from domestic and international capital markets for climate change adaptation, renewables and other environmentally friendly projects – green bonds´ only unique characteristic compared to conventional bonds is the specification that the proceeds need to be invested in projects that generate environmental benefits (United Nations Development Programme [UNDP], 2016). Despite a growing higher level international consensus on what constitutes a green bond, there is no single set of international criteria by which green bond issuers could establish the integrity of the "green" label, and the investors could verify the integrity of a green bond (e.g. Breen, 2017). Instead, there are a number of international and national taxonomies on green bond project definitions and rules on issuing process, reporting and verification (Organisation for Economic Co-operation and Development [OECD], 2016). Consequently, several prominent market players such as G20 Sustainable Finance Study Group (GFSG, 2018) and the United Nations Development Programme (Soezer, 2018) have recently advocated for more transparency, credibility and consistency in the green bond market.

The on-going European Union (EU) and China[1] dialogue focusing on finding a common language on green finance (European Investment Bank [EIB] & China Green Finance Committee [CGFC], 2018) can be viewed as one such progress step. The dialogue that started in 2017 is connected to the recent updates in the Chinese existing green bond standards and taxonomies, and the EU´s on-going process to develop EU wide voluntary standard, and a taxonomy for green bonds (EIB & CGFC, 2018). "Ultimately the joint work aims to provide a basis for future international cooperation on improving green finance definitions and standards with a view to facilitating cross-border green capital flows" (EIB & CGFC, 2018, p. 4). Ma Jun, Chairman of the CGFC working under People´s Bank of China (PBoC), furthermore points out that (EIB & CGFC, 2018):

> Greening global capital markets requires a common language for green bonds. This is increasingly important from a Chinese perspective, since the maturing national green bond market is experiencing a rapid expansion of cross-border issuance and investing as well. As similar trends are seen across global markets, greater compatibility of standards is essential for seamless international integration. With EU and China being two of the

[1] People's Republic of China

> biggest green bond markets globally, developing compatibility between the two can set a precedent for harmonization on a global scale. (p. 4)

Nevertheless, based on the initial literature review for the Thesis, it also became evident that different green bond standards may not be the only barrier in cross-border green capital flows between the EU and China. Although specific studies analysing the green bond market barriers in the context of the EU-China were not found, at least in the global context the "lack of local definition of green bonds" was only seen as one of the green bond market barriers according to a survey reported by GFSG (2016a, p. 32). In fact, some 43% of the respondents to the survey saw that the "lack of local definition of green bonds" is a major market barrier, whereas more important market barriers reported were for example the "lack of awareness of green bond benefits" (by 74% of respondents); the "difficulties for international investors to access local green bond markets" (67%); and the "lack of domestic green investors" (59%).

Furthermore, based on the initial analysis of a recent media discussion around green bonds, I soon found out that the EU-China green bond standard harmonization effort could prove difficult at least in the short term. Especially China allowing green bonds to finance coal-related projects has been seen as a major sticking point in the EU and China dialogue on finding common green bond definitions and rules (e.g. Lee, 2019). Since the recent updates in the Chinese existing green bond standards and taxonomies, and the EU´s on-going process to develop an EU wide voluntary standard, and a taxonomy for green bonds (EIB & CGFC, 2018), no comparison of these has been published yet. I saw this as a research gap that should be addressed in order to form a deeper understanding of the possible differences in standards and definitions of "green". Additionally, I thought it is important to also understand the drivers behind the regulation that currently dictates which types of projects/activities are seen eligible for green bond financing in China. This was viewed important as the Thesis is a part of Master´s Degree on East Asian studies focusing on China, and because I could not find academic literature specifically addressing the issue. Moreover, the analysis could help in understanding the possible differences in the types of projects/activities seen eligible for green bond financing in the EU and China.

This Thesis therefore attempts to answer the following research questions to examine how realistic and influential the EU-China search mission for common understanding on green bonds is:

1. Are there critical issues standing in the way of finding a common EU-China understanding on green bond standard rules and definitions?
2. What could be the domestic preferences impacting which projects/activities are seen eligible for green bond financing in China?
3. Would, in the EU-China context, a potential common understanding on green bond definitions and rules facilitate more cross-border flow of green financing?

As the Thesis deals with international relations between the EU and China on financial and environmental policy perspectives, it can be placed in the field of International Political Economy (IPE), which deals with the economic aspects of power and of how power and wealth are distributed (Cohn, 2016). Furthermore, Putnam´s (1988) liberal Two-Level Game Approach was applied as a theoretical framework as it has been rather widely used in the similar context of analysing domestic and international energy, climate and environmental policy dynamics and outcomes (e.g. by Keohane & Oppenheimer, 2016; Hochstetler & Viola, 2012; Rong, 2010; Lisowski, 2002; McLean & Stone, 2012; Betz & Hanif, 2010).

The analysis in the Thesis was carried out based on a qualitative multimethod approach combining green bond standard document comparison, media analysis and expert interviews. The multimethod approach was chosen as the convergent findings can potentially be accepted with greater confidence compared to findings of a single method, because each new data set rises confidence that the results mirror reality and not methodological error (e.g. Brewer & Hunter, 2006).

The results of this work may help to bring light to what should be prioritized by the EU and China in the bilateral green finance dialogue to facilitate more cross-border green finance. The results may also help to facilitate a wider discussion in developing a more unified green bond market especially because the role of both EU and China is significant in the global green bond market.

The following Background & Theory chapter deals with the green bond market in general, dives deeper into the EU-China specific developments in the green bond standards, the harmonization dialogue and market barriers. The Background & Theory chapter also introduces the theoretical framework, and summarizes the research questions, related

hypothesis, and the data and method applied in the Thesis. The Data & Method chapter focuses on describing the applied multimethod research method in general, and detailing the standard document comparison, media analysis and interview methods and the data used. The Results & Reflections chapter focuses on the key findings based on the standard comparison, media analysis and the interviews. The chapter also synthesizes and discusses the main results. Finally, the Conclusions chapter binds together the key elements of the whole Thesis.

2 Background & Theory

The following two sub-chapters deal with the green bond market in general, the EU-China specific developments in the green bond standards and the harmonization dialogue, as well as with the market barriers in the green bond and bond markets. The third sub-chapter introduces the International Political Economy as a theoretical framework and the Two-Level Game Approach, as well as look into the literature on preferences behind China´s environmental policy. Finally, the last sub-chapter summarizes the research questions, related hypothesis, and the data and method applied in the Thesis.

2.1 Introduction to Green Bonds

Green Bonds are part of a broader field on sustainable financing, where both or either, the environmental and social considerations are taken into account in investment decision-making process (European Commission, 2018). The environmental considerations mean taking into account climate change mitigation and adaptation, and more broadly environment and the related risks (European Commission, 2018). Social considerations in sustainable finance can include issues such as labour relations, inequality, inclusiveness, investment in communities and human capital (European Commission, 2018). Financing taking into account environmental factors can also be called “green finance” bringing benefits such as reductions in air, water and land pollution, and contributing to climate change mitigation and adaptation (GFSG, 2016a).

The purpose of the financial system, where also green bonds are traded, is to channel the surplus resources from companies and individuals to those having resource deficits, and thus satisfy the savings needs of the economy and allow accumulation of investment capital needed for the growth and development of the economy (Carmichael & Pomerleano, 2002). Households are typically the most important lenders but also the government, firms and non-residents often have excess funds to lend out (European Central Bank [ECB], 2011). The firms and the government are typically the principal borrowers, but also the households and non-residents finance their purchases by borrowing (ECB, 2011). There are three types of financing traded on the financial markets; debt, equity and contingent (Carmichael & Pomerleano, 2002). Debt financing includes corporate bonds, commercial paper, government treasury bills, mortgages and deposits (Carmichael & Pomerleano, 2002). Thus, green bonds are part of the debt financing, and often referred to as fixed-income securities because the lender can anticipate the

exact fixed amount of cash to be received at bond maturity (Hayes, 2019). Equity financing includes partly paid shares, preference shares and common stock which allow the owners to make claims over the residual earnings of the business and often carry voting rights over the operations of the business, whereas contingent financing includes insurance, warranties and guarantees, and promises to make specified payments triggered by specified circumstances - for instance damage to the property triggers insurance payment (Carmichael & Pomerleano, 2002).

In the bond market, the issuer of a bond must pay the investor for the privilege of using the investor´s money by paying interest; the interest payments (bond's yield or coupon) are made at a predetermined rate and schedule, and both fixed and variable interest rates are used (Hayes, 2019). The date when the issuer must repay the amount initially borrowed (the face value) is called the maturity date (Hayes, 2019). For example according to UNDP (2016) green bonds´ only unique characteristic compared to conventional bonds is the specification that the proceeds need to be invested in projects that generate environmental benefits. According to OECD (2016) green bonds are debt instruments that are used to finance green projects delivering environmental benefits and funds raised can be committed to be used either to finance or re-finance these "green" projects, business activities or assets by either private or public actors. The issuer of green bonds guarantee to repay the amount borrowed over a certain period of time, and remunerating creditors through a coupon with a variable or fixed rate of return (OECD, 2016).

According to the World Bank (2019), green bonds are today only one category of bonds used to raise funds for environmental and social projects, and the basic green bond issuance model with project selection, second party opinion, and impact reporting is being applied to other areas. According to Breen (2017) there are e.g. sustainability bonds, blue bonds and environmental impact bonds; sustainability bonds are typically used to fund projects primarily benefitting people through social impact, whereas blue bonds are used to fund projects benefitting the ocean, and environmental impact bonds to raise funds for environmentally beneficial projects where payments are made based on performance of the project.

Banga (2019) argues that the green bond market has developed due to three parallel market and policy phenomenon: 1) the increasing awareness of the investors and policy makers on potential climate change risks on businesses and financial sector as a whole, 2) the political will to limit global warming 2° Celsius above pre-industrial levels for which many countries

committed in signing the 2015 Paris agreement; and 3) The low interest rates in the aftermath of the 2008 financial crisis which have put pressure on institutional investors, such as insurance companies and pension funds, to make their savings products more attractive and reduce the rising costs of pension provisions.

2.1.1 Green bond market evolution

The green bond market kicked off in 2007 with the green bond issuance from multilateral institutions European Investment Bank and the World Bank (Climate Bonds Initiative [CBI], 2019). According to World Bank (2019) the issuance of first green bonds in 2007 was preceded by the publishing of the report by the Intergovernmental Panel for Climate Change (IPCC, 2007) that undeniably linked human action to global warming. A couple of years later, the Copenhagen Accord in 2009 established that the financial markets should be central in the fight against climate change by mobilizing private investments for mitigation and adaptation projects (Bachelet et al., 2019). It was widely agreed that the best way to promote these investments was to create financial products that appeal to investors with a substantial asset base, and thus green bonds were seen as innovative fixed-income investment product that could direct a significant amount of capital to climate finance (Bachelet et al., 2019). This gave a substantial political boost to the green bond market (Bachelet et al., 2019) but the wider bond market started to react after the first USD 1bn green bond issued by International Finance Corporation was sold within an hour in March 2013 (CBI, 2019). Today the green bond issuers include companies and banks of all sizes, and even several countries (World Bank, 2019). However, despite a rapid growth in the green bond market, green bonds still represent only 1.4% of the total fixed-income market (S&P Global, 2017).

Since the market kick-off in 2007, the green bond market has grown substantially (Figure 1) and expanded from Europe and North America to cover Asia-Pacific as one of the leading issuers.

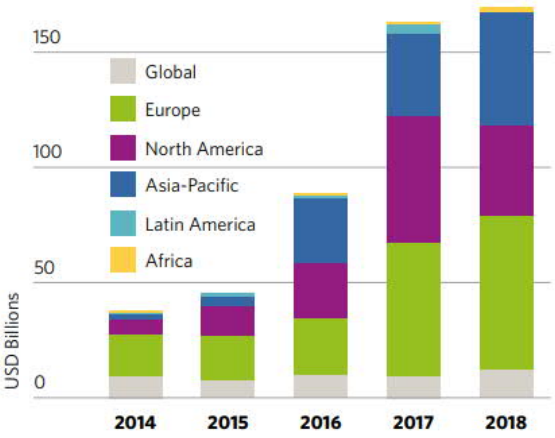

Figure 1. *Global issuance of green bonds by region. Source: CBI (2018a)*

When looking at the current global issuance of internationally aligned green bonds, issuers from US, China and France were in the Top 3 in 2018 (Figure 2). If the EU is considered as a one entity, the EU issuers combined would surpass the US and Chinese issuers in 2018 (CBI & China Central Depository & Clearing Company [CCDC], 2019).

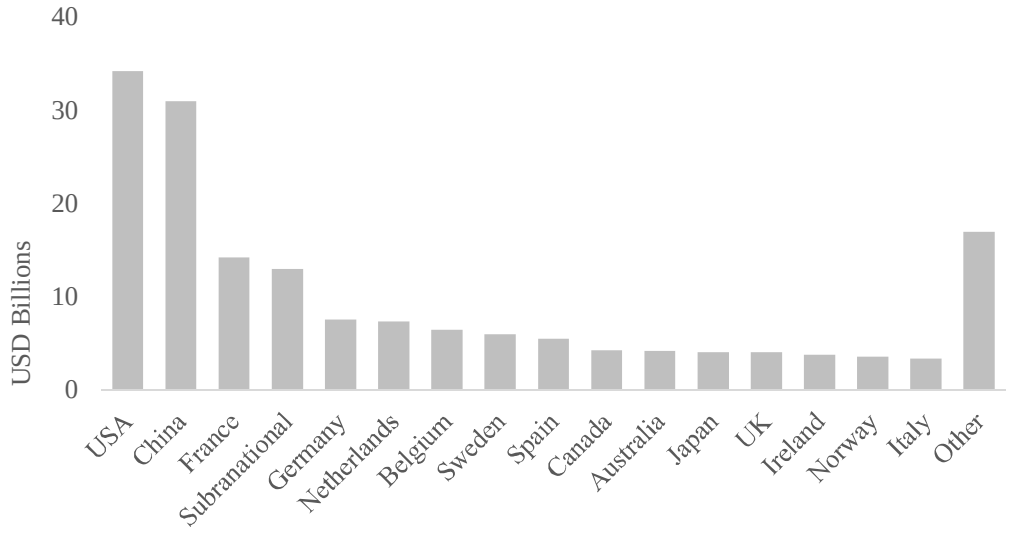

Figure 2. *Internationally-aligned green bonds issued in 2018 by country. Compiled by Author based on CBI (2018a).*

Globally the spread of types of green bond issuers in 2018 was quite wide with much of the volume was issued by corporates, but also by actors such as national and local governments and development banks (CBI, 2018a).

According to CBI (2019) the stock exchanges play a vital role in providing market access for green bonds and the dedicated green bond lists have been crucial in showcasing green bonds.

Of the fourteen Stock Exchanges globally that at present[2] have a dedicated green bond section, nine are in Europe, and from China Shanghai Stock Exchange is included (CBI, 2019).

2.1.2 Green Bond standards

Despite resembling conventional bonds, green bonds often require a more complex issuance process, since it takes typically at least three market players to get the bond to the market; the bond issuer, the verifier to prove that proceeds are used for green projects, and the investor/underwriter (e.g. Banga, 2019). According to OECD (2016), defining a green bond project and requirements for disclosure of the use of proceeds are the basis for developing a credible green bond market and avoiding "green washing". To address this, there are a number of international and national taxonomies on green bond project definitions and rules on issuing process, reporting and verification. However, e.g. according to Breen (2017) the growth in green bond issuance has not yet led to internationally binding standards or single set of criteria by which issuers could establish the integrity of the "green" label, and investors could verify the integrity of a green bond.

The most widely accepted green bond standards today are the Green Bond Principles, a voluntary guidelines elaborated by key market participants and coordinated by International Capital Markets Association, and the Climate Bonds Standard developed by scientific experts in coordination by the Climate Bonds Initiative (OECD, 2016). Also countries, such as China, have set their own green bond standards, and some regions, such as the EU, are on their way to create their own standards for green bonds (e.g. OECD, 2016; EIB & CGFC, 2018).

According to OECD (2016), in the absence of globally accepted specific guidance on what is a green project, the majority of issuers commission independent reviews of their green bond investment frameworks to enhance investor acceptance. Some issuers also self-label what constitutes a green bond, and skip using an independent review. According to Breen (2017) even if the green bond issuer is following one of the voluntary guidelines, most of these only require disclosure of how the proceeds are used and it is left up to the issuer to define what is green. Also, beyond the labelled green bond market, there are unlabelled bonds that support green projects but are not specifically green labelled; for instance, traditional bonds of "pure" wind energy companies qualify as unlabelled green bonds (Breen, 2017).

[2] Situation in August 2019

Pre-issuance external reviews are used to provide investors with information on what types of green projects the bond will fund, and what management processes the issuer uses to ensure that the funds are allocated only to the green projects (OECD, 2016). In the review process, second party reviewers[3] are commissioned to review the issuance framework – what proceeds will be used for, how the green projects will be selected, management processes for the proceeds and how issuers will report (OECD, 2016). The second party review report of the green bond is provided to investors, and the report is usually also disclosed publicly (OECD, 2016). After the independent reviewer approves the green bond, the issuer issues the labelled green bond in the debt capital market (Banga, 2019).

External reviews are also used post-issuance to assure investors that the funds are allocated as promised pre-issuance, and to provide more information on the environmental impacts of the bonds. Increasing number of green bond issuers also commit to annual post issuance auditing after which audit firms provide assurance of allocation of proceeds to green projects. Compared to post-issuance second party reviews, the audit firms provide it, and the focus is generally on the financial allocations to green projects and normally review of the environmental impact is not included. (OECD, 2016).

2.2 The EU-China green bond relations

The EU desires to be a global leader in setting benchmark for sustainable finance policy (European Commission, 2018), whereas also China has taken an active role promoting development of global green financial market for example by initiating the G20 Green Finance Study Group (GFSG, 2016b). Furthermore, according to EIB & CGFC (2018) both China and the EU share a global vision to make financial flows consistent with low greenhouse gas emission and climate-resilient development and agree on the need for sustainable investment and green finance to drive the transition.

2.2.1 Green bond standards in China

China´s green bond market was launched in 2015 when the PBoC published the first guidelines for green bond issuance, and for green bond definitions (OECD, 2016). This also made China the first country in the world to publish official rules on issuing green bonds (Breen, 2017). At

[3] Second party reviews are provided by external environmental expert organisations such as CICERO, Oekom, Vigeo, DNV GL, Sustainalytics and KPMG (OECD, 2016)

present different types of green bonds are regulated by different authorities, and also the general rules for green bond issuance differ depending on the type of green bond (EIB & CGFC, 2018).

Green Financial Bonds, Green Debt Financing Instruments, Green Corporate Bonds and Green Enterprise Bonds are all regulated by different authorities, and have different rules for disclosure of use of proceeds and external verification (EIB & CGFC, 2018).

Nearly 60% of Chinese onshore green bond volume in 2018 consisted of Green Financial Bonds regulated by PBoC (see Figure 3). The China Securities Regulatory Commission (CSRC) regulated bonds represented a bit over 20% of the volume, whereas Green Debt Financing Instruments regulated by National Association of Financial Market Institutional Investors (NAFMII), and NDRC regulated Green Enterprise Bonds each represented 10% of the volume.

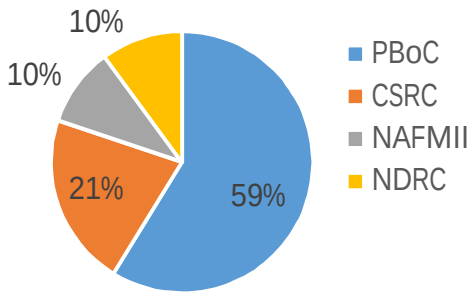

Figure 3. *China´s onshore issuance of green bonds by regulators (total 32.18 Billion USD in 2018). Sources: Compiled by Author based on CBI & CCDC (2019); EIB & CGFC (2018); International Institute for Sustainable Development [IISD] (unknown year); CBI & CCDC (2019) ref. WIND Financial Terminal.*[4]

For Green Financial Bonds, Green Debt Financing Instruments, and Green Corporate Bonds the definition of "green" has been based on the Green Bond Catalogue by PBoC, while for the Green Enterprise Bonds the definition is based on the National Development and Reform Commission´s (NDRC) Green Industry Catalogue (EIB & CGFC, 2018). However, harmonization of existing domestic green bond standards is underway as a part of a larger effort on harmonization of practices and standards in the financial system (EIB & CGFC, 2018). The

[4] Allocation to regulators; CBI & CCDC (2019), EIB & CGFC (2018) & International Institute for Sustainable Development [IISD] (unknown year). Volumes: CBI & CCDC (2019) ref. WIND Financial Terminal.

most relevant recent harmonization took place when the PBoC, several Ministries[5], and the NDRC together published an updated Green Industry Catalogue in March 2019 (NDRC, 2019a), which is expected to provide a unified reference for the classification of the green activities eligible for allocations from Chinese green bonds (EIB & CGFC, 2018). "This may not mean that all standards will be same, but that they have to include the same scope as the 'Green Industry Catalogue', while individually having different categories" (EIB & CGFC, 2018, p. 8). According to EIB & CGFC (2018) different green bond standards need to be updated when it comes to use of proceeds classification, to align at least with the scope of the Green Industry Catalogue, but the existing regulators for each type of green bonds may be kept.

2.2.2 Green bond standards in the EU

In Europe, 98% of green bond issuance is covered by external reviews and reporting standards are high (CBI, 2018b). The European green bond issuers currently choose which voluntary green bond standard framework to use when issuing green bonds (CBI, 2018b). However, in June 2019, the European Commission assigned EU Technical Expert Group on sustainable finance (TEG) published a Proposal for EU Green Bond Standard (TEG, 2019a) proposing creation of a voluntary, non-legislative EU Green Bond Standard setting rules on green bond issuing process, reporting and verification.

Furthermore, in May 2018 the European Commission published a proposal for a regulation on the establishment of a framework to facilitate sustainable investment (so-called Taxonomy Regulation)[6]. This is supposed to be an overall basis for the future EU green bond taxonomy defining green projects and economic activities that are eligible for green bond financing. In June 2019 the TEG published a "Taxonomy Technical Report, June 2019" (TEG, 2019b) providing a firmer basis for the EU Taxonomy: it contains an actual list of economic activities that can make substantial contribution to climate change mitigation and criteria to do no significant harm to other environmental objectives. Also, it presents a framework for evaluating substantial contribution to climate change adaptation. The list of economic activities is not exhaustive and additional activities should be added to the Taxonomy in future. Moreover, in September 2019, the European Council position on the overall Taxonomy Regulation (Proposal

[5] Ministry of Ecology and Environment, Ministry of Housing and Urban-Rural Development, Ministry of Industry and Information Technology, Ministry of Natural Resources, National Energy Administration

[6] Proposal for a Regulation of the European Parliament and of the Council on the establishment of a framework to facilitate sustainable investment, COM (2018) 353 final

of the European Parliament, 2019) was published, and this is used as a basis for the analysis in this Thesis.

The decision on the final EU green bond standard and taxonomy were recently delayed until the end of 2022, and the exact standard definitions are still somewhat under development at the EU level (Guarascio, 2019).

2.2.3 Green bond standard dialogue

Cooperation on green bond standards between PBoC´s Green Finance Committee and the EIB started in early 2017 with a long-term approach to reach green bond standard harmonization goal that would facilitate cross-border green capital flows (EIB & CGFC, 2018). Ma Jun, Chairman of CGFC and Member of the PBoC Monetary Policy Committee, views that greening global capital markets requires a common language for green bonds which is "increasingly important from a Chinese perspective, since the maturing national green bond market is experiencing a rapid expansion of cross-border issuance and investing as well" (EIB & CGFC, 2018, p. 4). Ma Jun also points out similar international market trends which require greater compatibility of standards (EIB & CGFC, 2018, p. 4). Furthermore, he states that as the EU and China are two of the world´s biggest green bond markets, "developing compatibility between the two can set a precedent for harmonization on a global scale" (EIB & CGFC, 2018, p. 4). According to Jonathan Taylor, Vice President of EIB, cross-border issuance of green bonds requires the translation of the classification standards, and that the ongoing work between EIB and CGFC should help certify compliance of EU's and China´s classification standards, facilitating authorization of green bonds issued by EU players in China by Chinese regulators.

EIB & CGFC have jointly published two white papers on green bond standard dialogue in the EU-China context. The first White Paper (EIB & CGFC, 2017) provides a comparative study of green bond project definitions by China, EIB and Multilateral Development Banks, and a comparison of the different assessment standards (rules on issuing process, reporting and verification) in China for different types of green bonds. In the second White Paper (EIB & CGFC, 2018) the focus is on the progress in the EU and China green bond standard related work, and the next steps of the cooperation.

According to EIB & CGFC (2018) the next step in the cooperation should be development of a translation framework between the China and EU green standards, ideally demonstrated by EIB issuing a RMB denominated green bond in China tying the standards together. This would provide clarity and demonstration effect required to internationalize the Chinese green bond market and establish a baseline for the further global harmonization of green bond standards. The China and EU standards being directly translated could allow a later adding of more standards to the framework (e.g. Climate Bond Initiative). Eventually, the translation tool could be digitalized and disseminated, providing a tool for comparing and understanding any green bond use of proceeds standard (EIB & CGFC, 2018).

2.2.4 EU-China Green Bond market barriers

Some 43% of the respondents to an international green bond market barrier survey (GFSG, 2016a, p. 32) saw that the "lack of local definition of green bonds" is a major market barrier, whereas more important market barriers reported were the "lack of awareness of green bond benefits" (by 74% of respondents); the "difficulties for international investors to access local green bond markets" (67%); the "lack of domestic green investors" (59%); the "lack of ratings, indices and listing" (56%); the "lack of targeted incentives for green bond issuers" (55%). Only the "high cost of meeting green bond requirements" (by 41% respondents) was seen as less important market barrier than the "lack of local definition of green bonds".

Based on literature review, specific studies analysing the green bond market barriers in the context of the EU-China were not found. However, there is some recent data on the cross-border green bond issuance and investments by the Chinese abroad and the foreigners in China, and recent literature on the general financial market opening in China, also specific to bond market. These are introduced below.

According to Malkin & Li (2019) China has never fully opened its financial system to global markets despite actively utilizing global capital markets, most notably via Hong Kong. Plans for capital account liberalization have been reversed several times, and despite the increasing internationalization efforts of RMB, the policies for financial market opening have been peculiar, even contradictory. China's financial policy prioritizes inbound capital flow liberalization at the expense of outbound liberalization, and thus it is easier for foreign investors to access financial markets in China than it is for Chinese investors to access international financial markets (Malkin & Li, 2019).

According to Feng et al. (2019) the opening of the bond issuance to foreigners in China started earlier, but today the level of opening-up on the investment side is higher. However, foreign investors currently only account for 2.3% of the Chinese bond market. Reasons for low foreign bond investment are the closed financial market in general (despite recent attempts to open up), fragmented and often changing regulation and policies, lack of a developed, market-oriented default mechanism, and low liquidity of the secondary bond market. There is also inconsistency in the accounting, auditing, netting, and rating principles inside and outside of China which has also hindered foreign investments. Compared with the scale of the whole bond market in China, the general panda bond market is still very small and immature, with weak regulation and low transparency being the main market development barriers (Feng et al., 2019).

The exact share of foreign investors in the current Chinese domestic green bond market is unknown, but international bond investors can access the green bond market only within the approved investment quota (CBI & CCDC, 2019). The green panda bonds consist less than 1% of the total green bonds outstanding in China (CBI & IDP, 2018). In 2018 76% of the Chinese internationally-aligned green bonds were issued by Chinese issuers on domestic market and 23% by Chinese issuers in overseas markets[7], where the issuance happens especially through Hong Kong and European Stock Exchanges (CBI & CCDC, 2019).

2.3 Two-Level Game Approach as theoretical framework

As the Thesis deals with the International Relations between the EU and China on financial and environmental policy perspectives, it can be placed in the field of International Political Economy (IPE), which deals with the economic aspects of power and of how power and wealth are distributed (Cohn, 2016). Furthermore, Putnam´s (1988) liberal Two-Level Game Approach is applied as a theoretical framework as it has been rather widely used in the similar context of analyzing domestic and international energy, climate and environmental policy dynamics and outcomes, as further introduced in the following sections.

2.3.1 International Political Economy

According to Cohn (2016), IPE deals with the economic aspects of power; On the political side with pursuit of power and influence by public and private actors, and on the economic side with pursuit of wealth and prosperity in the market. IPE also deals with a question of how

[7] The remaining 1% of the issuance was carried out by Hong Kong issuers (CBI & CCDC, 2019)

power and wealth are distributed. Importance of IPE research comes from politics and economics being intertwined as economic activities are important to many stakeholders such as state and individuals. Also, the global economic interdependence is growing which affects important economic activities (Cohn, 2016).

According to Cohn (2016) liberalism is a dominant theoretical perspective at the IPE research and has influenced strongly most international economic organizations and the economic policies of most current states. However, neomercantilism as the oldest IPE school of thought is a foundation for some present day IPE hybrid theories, and furthermore, critical perspectives to IPE, such as Marxism, also exists at least in the side-lines. Liberalism, emphasizes the importance of the free market and private property. It also typically attempts to limit the role of government, and lift the role of individuals in the economic affairs. Liberals assume that freely operating international economic interactions can be mutually beneficial, and therefore all states have possibility to gain from open economic relations even if the gains would not be equal. Liberals also view that international economic system functions best if it depends on the price mechanism and the market. Most liberals also view that state cannot alone deal with many global issues, such as climate change or financial crises, and thus it needs to work with other actors such as multinational corporations, International Organizations and NGOs. Neomercantilism, in contrast, views state as a central actor and preserver of national sovereignty and economy is seen as a creature of a state. Having capitalist markets is important but state must ensure that it serves its interests. International system is seen as "anarchic" as there is no central authority above the state, and the state must always consider a possibility of war or conflict (Cohn, 2016).

When it comes to China and IPE, China is the second largest economy globally, and a major global centre of manufacturing, overseas investor, trading power and holder of foreign exchange reserves (Zeng, 2019), and thus cannot be ignored when analysing international economy from political perspective. According to Zeng (2019), the state has continued to play an important role in shaping China's global economic activities. In constitutional terms China is a "socialist" system where the Communist Party of China is key in directing the economy (Guttman et al., 2018). According to Zeng (2019) China's growing integration into the global economy has led it to more actively pursue membership in international economic institutions and China has, for example, taken increasingly active role in global economic governance through institutions such as the G20, and in global climate negotiations. According to Pang

(2019) China also openly presenting itself as a reformist player in the existing global governance institutions and is sponsoring new international institutions to reform the global governance institutions. Joining RMB in the basket of currencies of the IMF's Special Drawing Rights and China's recently important role and success in the G20 also shows that China is moving quickly to a central position in global governance (Pang, 2019). China is also a member of the BRICS group which is an important hybrid platform for managing the global economy (Pang, 2019). Furthermore, China has recently acted as a middle actor or bridge between the so called developed world and the developing world in forums addressing global challenges (Pang, 2019).

2.3.2 Two-Level Game Approach

According to Putnam (1988) state leaders frequently participate in "two-level games" played concurrently at domestic (Level II) and international levels (Level I) when negotiating at multilateral or bilateral arenas. These leaders need to ultimately gain domestic approval for the international agreement to be successfully ratified.

Putnam´s (1988) approach is relevant for this Thesis as it focuses on exploring how international agreements can become politically possible, with understanding of internal bargaining being central to predictions. Thus applying two-level game approach to understand the impact of China´s domestic preferences on green bond standard negotiations with the EU felt meaningful.

Furthermore, based on a literature review, the two-level game approach has already been widely used in the context of analysing domestic and international energy and climate policy outcomes. Hochstetler & Viola (2012) discuss the possible ways to explain international cooperation in climate change negotiations, favouring frameworks stressing the importance of multiplicity of competing domestic actors and interests in shaping national foreign policies (such as by Putnam 1988, Moravcsik, 1997). Lisowski (2002) used two-level game framework to analyse the US abandonment of the Kyoto Protocol. Rong (2010) applied two-level game approach to analyse developing countries', including China´s, likely stances on climate negotiations. McLean & Stone (2012) used statistical analysis to test the theory of two-level games on the Kyoto Protocol using country-specific quotas negotiated under Kyoto as a quantitative index of bargaining outcomes. Keohane & Oppenheimer (2016) used Two-Level Game approach to analyse Post-Paris Climate Politics focusing on interstate game between

committed governments in OECD countries; the governments of BRICs; and the governments in small, poor states. Betz & Hanif (2010) used two-level game approach to consider both the national and international demands having an impact on India's choices in the energy realm, claiming that two-level game approach is suitable for explaining the dynamics of bargaining and policy formulation in the energy policy in which international and national challenges are interrelated to high degree.

Specific to China, according to Zhang (2009, para. 1) China wants "to play a key role on major global issues at the international level while reinforcing and consolidating its domestic reform program", and is thus playing a two-level game. Zhang also views that the two-level game strategy of China in the increasingly interlinked world raises interest as its domestic ratification of any regulation, law or agreement is immediately noticed at the international level. Zhang claims that China will thus face increasing international pressure on its domestic policy but this "will not be as important a driver of China's internal reforms as in the past", instead "search for alternatives that best serve China's domestic interests while balancing its international interests will be the key" (Zhang, 2009, para. 4). Zhang also views that China has to focus on several two-level balances in the future, for example on balancing the economic growth with climate change, clean energy use and environmental protection.

2.3.2.1 Win sets and preferences

Putnam´s (1988) research suggests that the governments can adopt policies different from those that they would have pursued in the absence of international negotiations, but the agreement is possible only if it is favoured on domestic grounds. Thus, neither international nor domestic game can be ignored by the key decision-makers. According to Putnam (1988, p. 434) "domestic groups pursue their interests by pressuring the government to adopt favorable policies, and politicians seek power by constructing coalitions among those groups", whereas at the international stage "national governments seek to maximize their own ability to satisfy domestic pressures, while minimizing the adverse consequences of foreign developments."

Putnam (1988) identifies win-sets meaning a set of all possible Level I (international) agreements that would gain the necessary majority among the domestic constituents. Agreement is only reached if the states´ domestic win-sets overlap. The larger the win-sets, the more likely they overlap, and the smaller the win-sets, the bigger the risk that the negotiations will fail. Generally, the state with smaller win-sets can make fewer compromises, and the other

state must make more of them to if successful result is desired. Thus, a small domestic win-set can be advantage in bargaining as a negotiator can say "I'd like to accept your proposal, but I could never get it accepted at home", whereas large domestic win-set implies that negotiator can be "pushed around" by the other Level I negotiators (Putnam, 1988, p. 440).

Figure 4 further demonstrates the win-set logic, where

- X_M &Y_M are the maximum outcomes for X and Y
- X_1 & Y_1 are the minimal outcomes that could be ratified, and any agreement between these could be ratified by both parties.

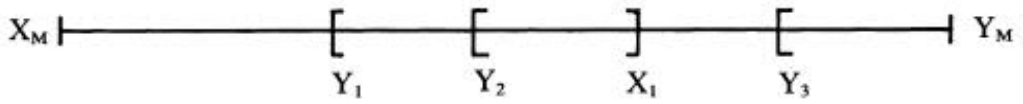

Figure 4. *An example of Win Sets. Source: Putnam (1988)*

If the win-set of Y were diminished to Y_2 the range of possible agreements would be reduced in Y's favor. However, if Y would reduce its win-set further to Y_3, the negotiations would get stuck, as the win-sets no longer overlap.

According to Putnam (1988) the win-set size is impacted by: (1) Level II (domestic) distribution of power, preferences, and possible coalitions; (2) Level II institutions; and (3) Level I negotiators' strategies.

When it comes to the size of the win-set depending on the distribution of power and preferences among Level II constituents, Putnam recognizes that it is important to understand if the domestic preferences towards the issues under negotiation are homogeneous or heterogeneous as this may have the implications on the negotiation results. Homogeneous preferences are present when the constituents view the issue generally in the same way but the only difference is in how important the issue is for them (extremely important or mildly important). When preferences are heterogeneous international agreement may encounter domestic opposition both from those who think it goes too far and from those who think it does not go far enough (Putnam, 1988).

Moravscik (1997) deals more in-depth with the preferences of domestic actors, viewing that state level policy is limited by the identities, interests, and power of individuals and groups who pressure the key decision makers to pursue policies consistent with their preferences.

Individuals and groups organize collective action and exchange to further their interests when there is conflict around fundamental values, scarce resources, or inequalities in political power. Contradictory values about matters such as borders, culture, and local social conditions promote conflict, whereas aligning beliefs promote cooperation. Extreme resource scarcity typically exacerbate conflict by increasing the willingness of social actors to accept cost and risk to obtain them. By contrast, relative abundance reduces the conflict risk by providing opportunity to satisfy needs. Furthermore, large inequalities in societal influence increase conflict risk whereas equally distributed social power increases chance for the costs and benefits of actions to be internalized to individuals. Moravscik (1997) also views that the state represents some individuals and groups more than others even in democratic societies.

According to Moravscik (1997) each state seeks to realize its preferences in the international arena under constraints imposed by the preferences of other states. When dominant domestic social groups seek to realize their preferences it means a set of costs and benefits for foreign societies, implying policy interdependence. If preferences are compatible or harmonious, chance for conflict is low. If preferences of dominant social groups impose negative externalities on dominant social groups in other countries, the underlying state preferences are deadlocked. As a consequence, governments face a bargaining game with few mutual gains and a high potential for tension and conflict.

2.3.2.2 Preferences behind China´s environmental policy

Based on a comprehensive literature review, no specific academic literature on the drivers behind the China´s green bond definitions was found. However, there is abundant and recent literature on the general drivers behind the environmental, energy and climate policy China pursues, some of which is summarized below. As green bonds are used to finance environmentally friendly projects, understanding these drivers can assist in forming an initial understanding of the preferences driving the Chinese green bond definitions.

China´s large industrial economy is built on the use of fossil fuels and today China is the largest national contributor to greenhouse gas emissions globally (Pearson, 2019). When measured by the amount of energy to produce each unit of gross domestic product, China is the most energy intensive of all the major economies as its economic growth is still relying much on heavy and high energy using industries such as cement and steel, and on infrastructure development with little regard to energy efficiency (Pearson, 2019). According to Davidson (2018), these large

energy-intensive and industrial activities have resulted in severe air, water and soil pollution. The economic growth has been especially dependent on coal as an abundant and cheap fuel, which has resulted in coal being a major contributor to air pollution in large cities (Davidson, 2018). The demands of the Chinese public have focused on the urgent need to tackle these major air pollution problems (Pearson, 2019). In fact, based on a rather recent opinion survey (Wike & Parker, 2015), air and water pollution were among the Top 2 and Top 3 public concerns, respectively, after the corrupt officials in China. Climate change, however, did not reach the top 15 concerns in the survey.

Along with the concerns over air quality, the Chinese academics and senior officials have encouraged applying clean coal technologies to reduce air pollutants and improve efficiency as part of the China's ongoing efforts to enhance air quality (Jing, 2019). China´s government has also coupled the attempt to reduce air pollution and carbon emissions simultaneously as it is often argued in China that actions reducing greenhouse gas emissions can also reduce air pollutants, although ground-level particulate matter and greenhouse gas emissions are technically different issues (Pearson, 2019). China not only needs to respond to domestic public concern over severe air pollution and has therefore engaged in international climate change mitigation effort (Pearson, 2019), but it also participates in climate effort as it recognizes that climate change could cause destruction on its economy and society (e.g. Pearson, 2019; Keohane & Oppenheimer, 2016; Rong, 2010). China (and other emerging powers and other large emitters) may also want to engage in climate action because it can have a meaningful impact on the outcome (Hochstetler & Viola, 2012). Also Pearson (2019) argues that international-level pressure would have opted China to take part in global climate effort.

In the mid-2000s the government started to prioritize shifting the source, and improving the efficiency of economic growth (Pearson, 2019). Especially after the Global Financial Crisis in 2008 the efforts were put to reduce reliance on manufacturing and infrastructure, and move toward increasing consumption and services as part of economic growth (Pearson, 2019). The government has also promoted clean energy industries and technologies that can substitute or offset greenhouse gas intensive fuels (Pearson, 2019). Shifting China´s economy from reliant on energy-intensive heavy industries to a cleaner energy growth model is nevertheless challenging and the problems of policy implementation in the decentralized authoritarian structure, and vested interests of the local officials in protecting industries representing a main source of jobs and income adds to the challenge (Pearson, 2019). Despite the central

government pushes for climate change mitigation, powerful local governments and large state-owned enterprises therefore often resist changes that do not benefit them (Pearson, 2019).

2.4 Research questions and hypothesis

The research questions and rationale behind them, as well as the hypothesis, and main data and methods used are introduced in the Table 1. To answer the three research questions and test the subsequent hypothesis, a qualitative multimethod approach was used combining (standard) document comparison, expert interviews and media analysis. The data and method used are explained in more detail in the Data &Method chapter.

Table 1. *Research questions, rationale, hypothesis, and main data & methods used. Compiled by Author.*

Research question	Rationale	Hypothesis	Data & Method
Are there critical issues standing in the way of finding a common EU-China understanding on green bond standard rules and definitions?	Since the main Chinese green bond taxonomy, and some of the rules on issuing process, reporting and verification are rather newly updated, and the EU´s similar regulatory documents are only at a proposal stage, there has been no published comparison of these yet. Thus, the comparison in this Thesis gives an early comparison of the currently available documents to initially analyse the alignment of the policies.	There are at least some critical points (coal-related green bond financing according to e.g. Lee, 2019) possibly standing in the way of an EU-China agreement on common green bond definitions and rules. Thus, it seems, in the framework of Two-Level Game Approach (Putnam, 1988), that the domestic (Level II) win sets of China and the EU do not currently overlap in some issues, which can be deemed as a hurdle in finding a common understanding on green bonds at international level (Level I).	Comparison of the green project definitions (taxonomies) in China and the EU Comparison of rules on green bond issuing, reporting and verification in China and the EU Expert interviews Media analysis
What could be the domestic (Level II) preferences impacting which projects/activities are seen eligible for green bond financing in China?	Based on literature review, no specific academic literature on the drivers behind the China´s green bond definitions was found. The analysis could also help in understanding the possible differences in the types of projects/activities seen eligible for green bond financing in the EU and China.	As China´s domestic (Level II) preferences behind the environmental and climate policy currently seem to favour air and water pollution over the greenhouse gas emission reductions (see Chapter 2.3.2.2), these preferences are also likely to be reflected in the definitions of green projects eligible for green bond financing.	Expert interviews Media analysis
Would, in the EU-China context, a potential common understanding on green bond definitions and rules facilitate more cross-border flow of green financing?	Based on literature review, specific studies analysing the green bond market barriers in the context of the EU-China were not found.	Literature reviewed on the international opening of the Chinese financial market (see Chapter 2.2.4) indicate that other market barriers hindering cross-border flow of financing would still exist even in case of common green bond definitions and rules. Thus even if the EU and China domestic (Level II) win sets would overlap in green definitions and rules, this does not automatically imply that cross-border flow of green financing would grow significantly as other barriers could still exist.	

3 Data & Method

To answer the three research questions and test the subsequent hypothesis (Table 1), a qualitative multimethod approach was used combining (standard) document comparison, expert interviews and media analysis. The following sub-chapter briefly describes the multimethod research in general and the rationale for using it in this Thesis. The sub-chapters after describe the individual methods, their application and the data used in this Thesis.

3.1 Multimethod research

According to Brewer & Hunter (2006) the fundamental idea of multimethod approach is to study the research problem with a wide range of methods that complement each other in strengths and have non-overlapping weaknesses, which means that convergent findings can potentially be accepted with greater confidence compared to findings of a single method as each new data set increases confidence for the results mirroring reality, and not methodological error. Furthermore, Brewer & Hunter claim that solutions based on multimethod findings are likely to have better empirical base and theoretical scope as they are grounded in diverse ways of viewing social reality. According to Hesse-Biber et al. (2015) multimethod approach is not restricted to combining qualitative and quantitative methods (like mixed method research) but can include a variety of methodological combinations.

Hesse-Biber et al. (2015) differentiate two types of qualitatively driven multimethod designs: concurrent and sequential designs. The concurrent design is typically comprised of two components that take place more or less at the same time, but there is a primary qualitative method (QUAL component) and supplementary qualitative method (qual component). This design usually consists of two separate data sets, which may originate from separate groups of participants. The data is typically analysed separately, with the results from the secondary component supplementing those from the primary component. Concurrent design is used for a variety of reasons: use of secondary qual component may provide a second and different perspective to the primary QUAL component, and/or, the secondary qual component may be analysed at a different level (e.g., micro level) than the primary QUAL component (e.g., macro level). A sequential design consists of two separate studies in which the secondary qual component arises and develops from the primary QUAL. Reasons for using this type of design may be a desire to obtain different or more detailed and comprehensive perspectives of a

particular phenomenon, according to Hesse-Biber et al. The secondary qual component may also be used to test the findings from the primary QUAL component.

For the purpose of this Thesis, the concurrent design serves better to describe the methodological setup. However, as the research questions differ somewhat in terms of what data & method is needed to answer them, the division of the methods into primary and secondary seemed impossible. Thus, the design can generally be viewed as:

qual1 + qual2 + qual3 → Findings and Interpretation, where:

qual1= Standard comparison

qual2 = Interviews

qual3 = Media analysis

However, related to the specific research questions, the first question can be viewed to rely most on the standard comparison and to be supported by the interviews and media analysis. Whereas for the second and third questions the interviews may be viewed as a primary method and media analysis as supplementing secondary method.

3.2 Document analysis

Both standard comparison and media analysis rely on reviewing and analysing documents as data sources. According to Bowen (2009) document analysis consists of systematic reviewing or evaluating of documents. When used in multimethod research documents can support or contradict, clarify, or expand on findings from other data sources helping to guard against bias (Gross, 2018). Analysing documents can provide background and context, additional questions to be asked, a way of tracking development and change, supplementary data, and verification of findings from other sources of data (Bowen, 2009).

Documents can be public or private, textual or visual, published or unpublished, hard copy or electronic, and can include both primary and secondary sources of data (Gross, 2018). The documents used in this Thesis are public, textual, and in electronic format. The standard documents can be considered as primary sources delivering a first-hand account of an occurrence or an event, without interpretation or analysis (Gross, 2018). The news articles analysed in the media analysis part of the study can include both primary and secondary

elements, where secondary means (according to e.g. Gross, 2018) documents developed as a result of analysing and interpreting primary sources in the topic of interest. In the analysis, the news articles can be viewed to be second hand sources as the articles were used for collection of background information or facts about the Thesis topic.

In general the document analysis is a time and cost-efficient process that requires data selection instead of data collection, and many documents are publicly available and obtainable without the authors' permission (Bowen, 2009). The documents also have "unobtrusive" and "non-reactive" qualities: they are unaffected by the research process (Bowen, 2009).

According to Bowen (2009) one of the weaknesses in document analysis is that the documents are created for other purpose than research and are independent of research agenda. Subsequently, they may lack detail to answer a research question (Bowen, 2009). Guest et al. (2012) point out another weakness of the document analysis as a method; analysis relies on interpretation of text by researcher, and as Gross (2018) brings up, may represent author's perspective and thus have bias. There may even be a selection bias if sample represents incomplete collection or limited selection of available documents on the topic (Gross, 2018). According to Bowen (2009) documents should thus not be treated as precise, accurate, or complete recordings of events that have occurred, and researchers should therefore understand the meaning of the document and how it contributes to the issues studied. As a subjective interpreter of data covered in documents, the researcher should make the analysis process transparent and rigorous (Bowen, 2009). According to Bowen (2009) the researcher should (with relevance to this study) assesses documents:

- relevance to the research purpose and problem (if content fits the conceptual framework of the study)
- credibility, accuracy, authenticity and representativeness
- original purpose and the target audience. Information about the author and the original sources of information could also be relevant to cover.
- coverage: comprehensive (cover the topic completely or broadly) or selective (cover only some aspects of the topic)
- evenness: even (balanced) or uneven (containing detail on some, and little or nothing on other aspects of the subject).
- data source: written based on first-hand experience or secondary sources

These aspects (as suggested by Bowen, 2009) as well as the possible weaknesses of the document analysis method are addressed in the following sections separate for the standard documents and media analysis documents.

3.3 Standard comparison

The Chinese and the EU green bond standards and taxonomies were compared pair-wise, comparing both the general rules on issuing process, reporting and verification, and the green project definitions (the taxonomies).

3.3.1 Data

Table 2 and Table 3 provide a comprehensive list of documents used in the standard comparison. It includes not only the name, purpose and official reference to each document, but also information on the possible way the document was modified for the analysis.

Table 2. *Standard Documents analysed – EU. Compiled by Author.*

Standard document & Reference	Purpose	Modification
Proposal for EU Green Bond Standard Official reference: EU Technical Expert Group on sustainable finance (2019a) or in short, TEG (2019a)	Proposed general rules on issuing process, reporting and verification of EU Green Bonds	No need
Proposal for EU Taxonomy Official reference: Proposal of the European Parliament (2019)	A proposal for general rules on defining what is `green` (European Council´s position)	Listing the project types systematically based on the formal proposal
EU Taxonomy Technical Report Official reference: EU Technical Expert Group on Sustainable Finance (2019b) or in short, TEG (2019b)	Expert recommendations for technical screening criteria for economic activities that can make substantial contribution to climate change mitigation or adaptation, while avoiding significant harm to other environmental objectives.	No need

Table 3. *Standard Documents analysed – China. Compiled by Author.*

Standard document & Reference	Purpose	Modification
The People's Bank of China Announcement No. 39 [2015], 中国人民银行公告〔2015〕第 39 号 Official reference: People´s Bank of China (2015)	Green Financial Bonds: general rules on issuing process, reporting and verification	Officially translated English document was available
Guidelines on Green Note of Non-Financial Enterprises, (March 17, 2017) 非金融企业绿色债务融资工具业务指引 Official reference: National Association of Financial Market Institutional Investors (2017)	Green Debt Financing Instruments: general rules on issuing process, reporting and verification	Officially translated English document was available
Guiding Opinions of the China Securities Regulatory Commission on Supporting the Development of Green Bonds, 中国证监会关于支持绿色债券发展的指导意见 Official reference: China Securities Regulatory Commission (n.d.) Notice of Shenzhen Stock Exchange on the Pilot Project of Green Corporate Bond Business [2016] No. 206, 深圳证券交易所关于 开展绿色公司债券业务试点的通知 深证上[2016]206 号 Official reference: Shenzhen Stock Exchange (2016) Notice on the Pilot Program of Green Corporate Bonds,[2016] No. 13, 关于开展绿色公司债券试点的通知, 上证发〔2016〕13 号 Official reference: Shanghai Stock Exchange (2016)	Green Corporate Bonds: general rules on issuing process, reporting and verification	Translation from Chinese to English
Guidelines for Issuing Green Bonds 绿色债券发行指引 Official reference: National Development and Reform Commission (n.d.)	Green Enterprise Bonds: general rules on issuing process, reporting and verification	
Green Industry Catalogue (2019) 绿色产业指导目录（2019 年版） Official reference: National Development and Reform Commission (2019a) or in short, NDRC (2019a)	Expected to provide a unified reference for the classification of the green activities eligible for allocations from all the Chinese green bonds (EIB & CGFC, 2018)	
Explanation Notes for the Green Industry Guidance Catalogue (2019) 《绿色产业指导目录（2019 年版）》的解释说明 Official reference: National Development and Reform Commission (2019b) or in short, NDRC (2019b)	Describes in detailed each industry in the Green Industry Catalogue (2019)	Translation of some of the project categories from Chinese to English

3.3.2 Method

3.3.2.1 General rules on issuing process, reporting and verification

The general rules for green bond issuing process, reporting and verification in the EU are proposed in the Proposal for EU Green Bond Standard (TEG, 2019a). These were compared with the similar rules in China, where Green Financial Bonds, Green Debt Financing Instruments, Green Corporate Bonds and Green Enterprise Bonds are all regulated by different authorities using different sets of regulations (see document references in Table 2 & Table 3).

To understand which attributes should be compared in the standard regulation documents, the first White Paper by EIB & CGFC (2017) was used as a background as it provides a comparison of different assessment standards (rules on issuing process, reporting and verification) in China for different types of green bonds at the time of publication. In the White Paper, the following attributes were compared (EIB & CGFC, 2017, p. 9): regulating actors, policy documents & release dates, use of proceeds classification, management of proceeds, project evaluation and assessment, and information disclosure.

In this Thesis the following green bond standard attributes were compared: definition of green bond, standard being mandatory/voluntary for the issuers, regulating actors, use of proceeds classification, use of proceeds rules, reporting at issuance, proceeds allocation & impact reporting, requirements for external verifier, and management of proceeds rules. Thus, the comparison covers more attributes than the comparison by EIB & CGFC (2017), and includes also the Proposal for EU Green Bond Standard (TEG, 2019a).

3.3.2.2 Green project definitions (Taxonomies)

To compare the activities that are deemed “green” and eligible for financing by green bonds in the EU and China, the proposed EU Taxonomy (Proposal of the European Parliament, 2019; TEG, 2019b) and China´s Green Industry Catalogue (NDRC, 2019a; NDRC, 2019b) were analysed.

The analysis was carried out following a content alignment methodology, which according to Rolfhus et al. (2010) means identifying and analysing if content in one set of standards (comparison set) is the same as the content in another set (benchmark set). Content alignment in terms of standard documents has been, based on literature, especially used in the field of educational research (e.g. Rolfhus et al., 2010; Bhola et al., 2003). Rolfhus et al. (2010) carried

out pairwise comparison to research educational standards, individually aligning the standard statements of the comparison sets with the standard statements of the benchmark set. More specifically, two expert-raters used three-level content alignment scale (complete alignment, partial alignment, and no alignment) to rate the level of content alignment, and final alignments and ratings were determined in a consensus meeting with a third senior reviewer (Rolfhus et al., 2010). According to Rolfhus et al. (2010) and Bhola et al. (2003) the expert rating is typical, and according to Bhola et al. (2003, p. 22) the rating scale can range from "no match at all" to "matches exactly", and thus is not fixed to three level scale that was used by e.g. Rolfhus et al. (2010).

In this Thesis, the Green Industry Catalogue, containing 211 green activity categories, was used as a benchmark set for the analysis. The content of each of these green activity categories were first analysed in detail before determining if they can be viewed to align with the green definitions of the proposed EU Taxonomy.

A rating scale similar to Rolfhus et al. (2010) (complete, partial, no alignment) was used initially, but after the initial analysis the scale was changed to following six level rating scale:

1) Aligned, 2) Not aligned, 3) Partly aligned, partly not aligned, 4) Partly aligned, partly unclear, 5) Partly not aligned, partly unclear, 6) Not clear if aligned

The rating was carried out by the Thesis writer; I have worked intensively with both international policy analysis and the subjects at hand (energy, waste, fuels, biodiversity, natural resources) for almost 10 years as an expert, and can therefore be viewed to have the expertise needed for the expert review. No external verification by a different rater was conducted, but for even more comprehensive research it could be beneficial and recommended.

3.3.3 Reliability of the data and method

When assessing the reliability of the data and method, taking into account for example Bowen´s (2009) criteria introduced above, the following observations were made.

The credibility and authenticity of the green bond standard and taxonomy documents can be deemed high as they are first hand sources and official documents with the purpose of guiding green bond issuers, verifiers and investors on rules on issuing process, reporting and verification, and on what types of projects are considered as "green" and eligible for green bond financing. As standard documents are regulatory documents not representing personal opinions, the risk for author´s bias (Gross, 2018) can also be deemed small. The accuracy of

the documents is generally good, but based on the analysis some definitions of green eligible projects were quite vague making analysis and comparison in those cases difficult. Also, the EU standard documents are still at proposal stage, and therefore include unfinished definitions. These are discussed further in the Results & Reflections chapter.

Representativeness of the documents was very high at the time the analysis was carried out in Autumn 2019, as the documents analysed covered the relevant standard documents available in the EU and China. However, at the moment of finalising the Thesis (spring 2020) the risk for the document sample representing incomplete collection or limited selection of available documents on the topic (Gross, 2018) can be viewed somewhat significant as the latest documents published by the EU Technical Expert Group on sustainable finance[8] were not analysed. This is a major shortcoming in the analysis, but at the same time the work by the EU on the Green Bond standard and taxonomy is still on-going and a proper comparison of the documents can, anyhow, only be done once that process is complete.

The standard documents analyzed for this Thesis have been created for other purpose than research, and lack detail to answer all the research questions (seen as a downside of the document analysis method e.g. by Bowen, 2009). However, the document analysis is still important, and provides the background needed for this study. Nevertheless, alone the standard document analysis could not have answered the research questions, and therefore media articles and interviews were need to complement the analysis especially when it comes to understanding possible preferences behind the green project definitions in China, and the green bond market barriers.

As Guest et al. (2012) point out, the document analysis relies on interpretation of text by researcher. To compare the green bond taxonomies and rules for the Thesis, I needed to make own interpretations especially when it comes to comparing the green definitions. In addition, no external verification by a different rater was conducted. Also, some documents were only

[8]On 9 March 2020, the EU Technical Expert Group on sustainable finance issued a report giving its final recommendations to the design of the EU Taxonomy and guidance for its users. Additionally, a "EU Green Bond Standard (EU GBS) Usability Guide" was published to support potential EU Green Bond issuers, verifiers and investors in the practical application of the standard. (European Commission, 2020).

available in Chinese and these needed to be translated which includes a minor risk of translation errors that could impact the results.

3.4 Media analysis

The media analysis in this Thesis means analysing selected and recent international news articles covering the issues relevant to this Thesis. This was carried out to complement the findings from the interviews and standard and taxonomy document comparison in order to provide answers to the research questions.

Gross (2018) suggests creating an inclusionary and exclusionary criteria to focus the selection of documents and ensure representativeness of those identified for the document analysis sample. Inclusionary criteria are also essential for ensuring systematic document selection and reducing irrelevant data collection and exclusionary criteria are important to narrowing the list of potential documents to the final sample, and to ensure representativeness, topic and content relevance, and appropriateness (Gross, 2018). Parameters to consider as inclusionary can be for example document age, geographic representation and the type of documents (for example, official vs opinion-based documents) (Gross, 2018).

For this Thesis, following inclusionary criteria were used to select the news articles to be included in the final sample:

- Topics: Green bond standard cooperation between EU and China, focus of China and its priorities in green finance, and development in green bond market standards in China
- Age: Recent articles from 2017 onwards were chosen as the green bond standard dialogue has been quite recent
- Geographic representation: the EU and China with especial focus on China giving light to its domestic preferences relevant to green finance and bonds

Type: Publicly available news articles in English from globally established and well-known media channels such as newspapers. Focus on articles that convey the message from the field, and not opinion of a journalist.Table 4 lists the documents included in the final sample of news articles used in this study, and their main demographics (as suggested by Gross, 2018). The articles were searched online, based on the key words listed in the Table 4.

Table 4. *Demographics of the news articles used in the analysis. Compiled by Author.*

Title	Journal, Author, Date	Context/Key words	Reference in the Thesis
Ma Jun: 'Europe and China have different priorities' on green finance.	China Dialogue, Han, X., 2017, October 24	China, Europe, green finance	Han (2017)
China, EU up the ante on environmental cooperation.	China Daily, Liqiang. H., 2018, December 7	China, EU, green bond standards	Liqiang (2018)
China Pledges to Further Open Bond Market to Foreign Investors.	Bloomberg News, Zhao, Y., Zhao, J., & Zheng, W., 2019, January 17	China, bond market, opening	Zhao et al. (2019)
China: The greening of China	IPE, Chong, F., 2019, February	China, EU, green bonds	Chong (2019)
China and EU seek common ground on environmentally friendly green bonds	South China Morning Post, Lee, A., 2019, March 21	China, EU, green bond standard, clean coal	Lee (2019)
China to cut coal from new green bond standards: sources.	Reuters, Stanway, D. & Galbraith, A., 2019, March 21	China, green bond standard, coal	Stanway & Galbraith (2019)
China expected to allow green bonds to fund clean coal projects in potential blow to climate change fight	South China Morning Post, Jing, L., 2019, September 12	China, EU, green bond standard, clean coal	Jing (2019)
EU states delay 'green' finance guide, leave it open to nuclear power	Reuters, Guarascio, F., 2019, September 25	EU, green finance	Guarascio (2019)
In China, coal creeps back in as slowing economy overshadows climate change ambitions	Reuters, Stanway, D., 2019, December 2	China, coal, climate	Stanway (2019b)

As can be viewed from Table 4, the final sample includes only electronic issues of global English speaking newspapers reporting on financial markets. The articles focus mostly on the Chinese green bond market and the EU-China dialogue on green bond standards.

3.4.1 Reliability of the data and method

When assessing the data and method reliability, taking into account for example Bowen´s (2009) criteria introduced above, the following observations were made. The news articles can be viewed as rather credible sources of information as they were collected from known media sources. Nevertheless, the articles are second hand sources in the context of this Thesis as they were used for collection of background information and facts about the Thesis topic, and thus there is some risk that the journalists have made misinterpretations when writing out the expert interview results in the articles. As the news articles chosen for the sample already are very focused on the study subject and the articles are concise, there is quite little risk of subjective interpretation of researcher clouding the results and creating bias (a risk pointed out e.g. by Guest et al., 2012; and Gross, 2018).

The final sample of news articles only includes selected news articles whereas the whole population of news articles covering issues relevant to the study could be larger. Thus the sample is generally selective (not comprehensive), and there is some risk for selection bias as the sample may represent incomplete collection or limited selection of available documents on the topic (a risk pointed out e.g. by Gross, 2018). Furthermore, the media analysis cannot alone provide answers to the research questions, as the articles were created for other purpose than research and are independent of research agenda (Bowen, 2009). To mitigate these risks, the analysis was complemented with other methods.

3.5 Interviews

"Interview is a process in which a researcher and participant engage in a conversation focused on questions related to a research study. These questions usually ask participants for their thoughts, opinions, perspectives, or descriptions of specific experiences." (DeMarrais, 2004, p. 54).

According to Rubin & Rubin (2005) qualitative interviewing is a dynamic and iterative process, and not simply advocates learning about a topic, but also learning what is important to those being studied. DeMarrais (2004, p. 55) views that interview is "a unique form of discourse between two people where one is an informed learner who is there to learn more about another´s experiences or series of experiences, views, or perspectives, or reactions to a particular phenomenon or event." Furthermore, the interviewed participants have control over the content of data collected (Choy, 2014).

Rubin & Rubin (2005) categorize interviews into two broad categories, topical and cultural, but state that typically they involve both approaches with one being more dominant. Topical interviews examine what happens in specific circumstances and explore what, how, when, why, or with what consequence something occurred, whereas cultural interviews explore the ordinary, the routine, the shared history, the norms, values and rituals, and the expected behavior of a group of people (Rubin & Rubin, 2005). The interview project under my Thesis focuses much on events and processes and can thus be viewed as topical interview design.

3.5.1 Data and method

When designing the interviews the researcher should according to Rubin & Rubin (2005) choose knowledgeable interviewees whose combined views a balanced perspective, and who can help test the emerging theory.

DeMarrais (2004) describes strategies on how to select the persons to interview; in this Thesis the reputation-case selection strategy was used where selection is based on recommendation of others (DeMarrais, 2004). I received the contact information of the final interviewees´ via two persons with expertise within the sustainable finance field but who themselves did not have a strong specific experience in EU-China green bond market and standard fields. Of the three initial suitable contacts received by recommendation, two agreed to be interviewed. In addition to the contacts received based on recommendation by others, I also directly contacted a person at EU chamber of commerce in China, the Banking & Securities Working Group based on a internet search, but that person refused an interview due to lack of specific knowledge on green bonds.

Table 5 lists the persons interviewed including the person´s name, title, green bond experience statement, description of the organization, and the place and time of the interview.

Table 5. *Interviewed persons. Compiled by Author.*

Name, title and experience	Description of organisation	Date and place
Lars Eibeholm, Vice-President, Head of Treasury, Nordic Investment Bank (NIB) Chair of International Capital Markets Association (ICMA) Green, Social and Sustainability Bonds executive committee	• Nordic Investment Bank is international financial institution of the Nordic and Baltic countries[9] • NIB has issued Environmental Bonds since 2011 and is the biggest Nordic green bond issuer.[10] • NIB and the Ministry of Finance of the People's Republic of China have a loan programme to finance environmental improvements and projects in selected sectors of the Chinese economy.[11]	4 November 2019, NIB headquarters, Helsinki
Christa Clapp, Research Director, CICERO Leads the climate finance work at CICERO, including climate risk for investors and green bonds. Has rated some Chinese green bonds when they have been issued in the EU market.	• CICERO is a leading provider of independent reviews of green bonds since the market's inception in 2008.[12] • CICERO has rated some Chinese green bonds when they have been issued in the EU market.[13]	12 November 2019, phone interview

Prior to carrying out the interviews an interview protocol was created, as suggested by Rubin & Rubin (2005), which is a written version of the main questions. The protocol was pre-shared with the interviewees as again suggested by e.g. Rubin & Rubin (2005), and can be found in Appendix 1: Interview Protocol.

During the interviews, the following questions were asked, keeping the structure and the questions the same for both interviewees to get as wide a perspective to the same issues as possible and to make the analysis of the answers coherent.

- **Green Bond Market barriers (EU-China-EU) in general:**
    1. What are the main **market barriers** for EU green bond issuers and investors in the Chinese domestic green bond market?
    2. What are the main **market barriers** for Chinese issuers and investors in the EU?
    3. Do you see **positive signals** in solving possible market barriers?
    4. If there would be, in theory, no barriers for EU investors and issuers in China´s green bond market, would there be a large **interest** to access the market and why?
- **Green Bond Market access (EU-China-EU):**

[9] Nordic Investment Bank [NIB] (2019)
[10] NIB (2018)
[11] NIB (2017)
[12] CICERO (2018)
[13] based on the interview

5. Do you find that there is an **inbalance** in the green bond market access for Chinese actors in the EU vs EU actors in China? If yes, do you see positive signals in solving these?

- **EU and China on-going dialogue in translating their Green Bond Standards:**
    6. Who would likely **benefit** most from a common understanding on green bond standard? Why?
    7. What are the **major hurdles** in finding a common understanding? Why these exist?
- **Other**
    8. Would you like to mention **something else** about EU-China green bond relations that could be relevant?

Rubin & Rubin (2005) suggest putting into the interview transcript only the level of detail likely to be analysed and including only information that might influence the interpretation. In my Thesis I took detailed notes of the interviews and focused only on writing what the interviewees said and did not include the possible comments I made as an interviewer. This type of recording was carried out as it was more important to focus on what was said by the interviewees rather than how it was said as the focus was much on the topic and not on the cultural or behavioural elements. After each interview, memo files were created with comments to the transcribed interview notes to structure the findings and thinking as suggested by Rubin & Rubin (2005).

The interview notes and memo files are not disclosed in the Thesis as the interviewees wanted to keep the specific individual statements confidential. This is also reflected in the Results & Reflections chapter, where in the sections focusing on findings from the interviews no specific references to the interviewees are made. Instead, the findings are summarized so that the wished confidentiality is ensured.

3.5.2 Reliability of the data and method

Generally, interviewing is a time consuming process (Choy, 2014), and when it comes to the needed number of interviews per study e.g. DeMarrais (2004) views that when researcher starts to see similar patterns in the responses or when little new information is received, it is generally good time to stop. Based on my research questions and hypothesis, an initial thought was interviewing ideally 3 to 5 experts that have worked with EU-China green bond market and have an understanding of the green bond standard work. However, despite the plan and attempts to contact several experts, only two interviews were carried out in the end. Therefore, much more time efficient media analysis was conducted to supplement the results.

According to Choy (2014) researchers´ personal experience and knowledge influence observations and conclusions. In the context of this Thesis, the focus of interviews was on gathering information relevant to the Thesis topic and not observe the interviewees behaviour. Therefore, the impact of the interviewer on the observations and conclusions, and the risks from the bias of researching cooperative and competent subjects (Brewer & Hunter, 2006) can be viewed small. Choy (2014) also brings out that the interviewer needs to be skilful in order to interviews to be successful and reliable. As I have previous extensive experience in conducting interviews as a management consultant, as well as by a good previous subject matter understanding in the "green" topics, it can be viewed that I was skilful enough to carry out the process. I also prepared well for the interviews to understand the financial market specific aspects covered in the interviews, where I had not that wide previous experience.

4 Results & Reflections

The Results & Reflections chapter focuses on answering the three research questions posed in the beginning of the Thesis based on the standard comparison, expert interviews and media analysis carried out for the purpose. The chapter has three separate sub-chapters that each focus on the specific research questions posed. Each of the sub-chapters first introduce the main results based on the individual methods and data used. The last part of each sub-chapter focuses on the synthesis of the results and on the reflections based on these.

Before going to the main findings, I want to bring out the main reservations that are connected to the findings. The Data & Method chapter details the observations on the reliability of the data and methods used, but here the focus is on the most relevant observations. Hence, when it comes to the reliability of the findings from the standard comparison, interviews and media analysis, the main risks relate to the standard document sample representing incomplete collection or limited selection of available documents on the topic (Gross, 2018). The latest green bond documents published by the EU Technical Expert Group on sustainable finance[8] were not analysed as the Thesis analysis part was carried out in late 2019 whereas the work was otherwise finalized in spring 2020. This is a major shortcoming in the analysis, but at the same time the work by the EU on the EU Green Bond Standard and Taxonomy is still on-going and a proper comparison of the documents can, anyhow, only be done once that process is complete. Furthermore, despite a plan and attempt to interview several experts, only two interviews were carried out in the end. Nevertheless, I found the interviews to be of high quality and insightful and supplementation of the findings with media analysis can be viewed to bring further credibility to the results.

4.1 Alignment of green bond standards and taxonomies

The first part of this sub-chapter highlights the main findings from the comparison of green bond rules on issuing process, reporting and verification, as well as from the comparison of the green bond taxonomies in the EU and China. To expand on these findings, the second and third part of this sub-chapter focus on the findings from the expert interviews and the media analysis, respectively. The last part of this sub-chapter includes a synthesis of the results and focuses on the reflections based on these.

The research question addressed in the analysis is if there are critical issues standing in the way of finding a common EU-China understanding on green bond standard rules and definitions. The hypothesis is that there are at least some critical points, for instance coal-related green bond financing (Lee, 2019), possibly standing in the way of an EU-China agreement on common green bond definitions and rules. Thus, in the framework of Two-Level Game Approach (Putnam, 1988), the domestic (Level II) win sets of China and the EU do not currently overlap in some issues, which can be deemed as a hurdle in finding a common understanding on green bonds at international level (Level I).

4.1.1 Standard comparison

The first section introduces the findings from the comparison of green bond rules on issuing process, reporting and verification in the EU and China. The comparison focuses on the four different sets of rules in China depending on the type of green bond, and on the proposal for EU Green Bond Standard.

The second section introduces the findings from the comparison of green bond taxonomies in the two regions. Comparison of green bond taxonomies is based on the Green Industry Catalogue in China, and the proposed EU Taxonomy. Both are planned to serve as references to what types of activities/projects are seen eligible for receiving green bond financing. What is referred to as "EU Taxonomy" in the following analysis includes both the analysis of the Proposal for EU Taxonomy document (Proposal of the European Parliament, 2019), and the EU Taxonomy Technical Report document (TEG, 2019b). What is referred to as "Green Industry Catalogue" includes both the analysis of the main Green Industry Catalogue document (NDRC, 2019a) and the related explanation notes (NDRC, 2019b). See Table 2 and Table 3 for more details.

4.1.1.1 Rules on issuing process, reporting and verification

Based on the comparison there is variation in China in the green bond rules on issuing process, reporting and verification depending on the type of green bond, as well as between the EU and the Chinese rules in general (Table 6). Generally, the proposed EU Green Bond Standard can be viewed as the strictest in terms of requirements and transparency, whereas the Chinese standard for Green Enterprise Bonds the most loose in requirements, and least transparent (Table 6). Detailed comparison results are presnted in Appendix 2: Detailed Standard Comparison.

Table 6. *Summary of the findings from comparison of general rules on green bond issuing process, reporting and verification. Source: Compiled by Author, but see Table 2 & Table 3 for document references.*

EU	**China**			
Proposal for EU green bond standard	**Green Financial Bonds**	**Green Debt Financing Instruments**	**Green Corporate Bonds**	**Green Enterprise Bonds**
Voluntary standard	Mandatory standard with specific regulator for each type of bond			
Green projects defined according to EU Taxonomy Regulation	Green projects defined according to Green Bond Endorsed Project Catalogue but should move to use Green Industry Catalogue			Green projects defined according to Green Industry Catalogue
Detailed reporting required latest at issuance	Detailed reporting required pre- issuance			Detailed reporting not required pre-issuance or at issuance but issuer may do so
Allocation and impact reporting required	Allocation reporting required, impact encouraged	Allocation and progress reporting required, impact encouraged	Allocation, impact and progress reporting required	Allocation, impact and progress reporting requirements not specified
Mandatory verification for some reporting, encouraged for some	Encourage verification of reporting			Verification rules not specified
Verifiers must be accredited	Verifiers don´t need to be accredited but should be independent and professional			Verification rules not specified
Use of proceeds rules quite complex and allow some proceeds to be used for working capital	Use of proceeds rules allow some unallocated proceeds that can be used for investments in other type of green bonds	Use of proceeds rules quite vague and allow some proceeds to be used for working capital	Use of proceeds rules quite vague and not very specific	Use of proceeds rules quite clear and allow 50% to be used for working capital
Need to track the management of proceeds				Need to track the use of proceeds not specified

4.1.1.2 Green bond taxonomies

Based on the analysis and comparison of the green bond taxonomies (see Appendix 3: Full Taxonomy Comparison for detailed results), the proposed EU Taxonomy has seven environmental objectives for which the economic activities should significantly contribute to in order to be seen "green": climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, waste prevention and recycling, pollution prevention control and protection of healthy ecosystems. Whereas the Green Industry Catalogue has six general objectives/categories: Clean Energy Industry, Cleaner Production Industry, Eco-Environmental Industry, Energy-saving and

environmental protection industry, Green Service and Green Upgrading of Infrastructure. Each of these Chinese categories include activities that can be viewed to contribute to several EU environmental objectives, and only the activities under "Clean Energy Industry" can be viewed to have contribution to only one EU objective: the Climate Change Mitigation. For the detailed results, see Appendix 3: Full Taxonomy Comparison.

The proposed EU Taxonomy not only requires economic activities to contribute significantly to at least one environmental objective to be deemed "green" but also requires that the activity should avoid significant harm to other six environmental objectives. This kind of requirement is missing from the Green Industry Catalogue. While the Green Industry Catalogue includes some green activities that imply taking into account social sustainability there is no general requirement for social safeguards. The proposed EU Taxonomy, meanwhile, does not include economic activities that would be carried out for the social sustainability purposes but requires generally that economic activity must comply with minimum social safeguards[14] in addition to complying with green requirements.

The proposed EU Taxonomy categorizes green activities into "green", "greening of" and "greening by" when it comes to climate change mitigation. The "green" activities are already low carbon activities which require capital to increase their development and wider deployment. The "greening of" activities improve environmental performance of the economic activity: in climate change mitigation they contribute to transition to net-zero emissions economy in 2050 but are not yet at net-zero carbon emissions level, and must thus significantly enhance their performance beyond the industry average, without lock-in to carbon intensive assets or processes. The "greening by" activities enable improved environmental performance in other sectors of economy and are performed to prevent substantial negative impact on environment. These activities may not result in the target economic activity being brought in line with technical screening criteria. Similar systematic categorization is missing from the Green Industry Catalogue but all three types of activities ("green", "greening of" and "greening by") are present in the Catalogue. The Green Industry Catalogue also specifies these kinds of activities not only for climate change mitigation and adaptation, but also for other environmental objectives whereas the proposed EU Taxonomy leaves, at least still, it unclear for other than climate change mitigation and adaptation objectives.

[14] International Labour Organisation´s core labour conventions under the proposed regulation

When it comes to the detailed comparison of the taxonomies, the key finding is that when using the Green Industry Catalogue as a benchmark standard set, the majority (64%) of the total 211 categories in the Green Industry Catalogue can be viewed to be aligned with the proposed EU Taxonomy. Only 6 % of the categories can be viewed to not align with the proposed EU Taxonomy and 1% of the categories can be considered to partly align and partly not. For a rather high share (30%) of the categories the alignment is not clear; these include both categories where alignment is fully unclear, and categories for which alignment is partly clear and partly unclear.

Appendix 3: Full Taxonomy Comparison views all the categories in the Green Industry Catalogue and shows the alignment result against the proposed EU Taxonomy, while the next sections focus on the categories that can be viewed not to align, only partly align or have unclear alignment.

4.1.1.2.1 Non-aligning definitions

Based on the analysis of the proposed EU Taxonomy and the Green Industry Catalogue it can be verified, as suggested by initial media analysis (e.g. Lee, 2019), that the Green Industry Catalogue includes clean coal[15] energy use, production and manufacturing of equipment for clean coal use as eligible categories for green bond financing (see Table 7: 1.1.1, 1.1.2, 3.3.2, 3.3.3, 3.4.4). Where the Green Industry Catalogue allows clean coal, the proposed EU Taxonomy basically rules it out. Based on the proposed EU Taxonomy, coal-fired power with carbon capture and sequestration may qualify in the short-term, but new coal plants generally have lifetime of 40 years or longer and thus even with carbon capture and sequestration, investment in new coal use won´t be accepted.

Based on the analysis the major differences in the Taxonomies, besides clean coal, are the Green Industry Catalogue promoting (long term) production and use of natural gas, and in some occasions also oil, and manufacturing of related technologies (see Table 7). The proposed EU Taxonomy also allows natural gas use, but basically only in short term for energy production: unabated natural gas-fired power generation is not expected to meet required greenhouse gas emission threshold after 2050 but gas-fired power with carbon capture and sequestration may

[15]Clean coal technology generally means using more efficient coal-fired power plant technology than conventional one, use of carbon capture and storage during operations, or reducing pollutants such as particulate matter, SOx, NOx, and heavy metals with clean coal technologies (Tang et al. 2015). Clean coal in Chinese context often means relying on technologies such as high-efficiency boilers, refining coal before burning, and converting coal to chemicals (Jing, 2019).

qualify even after 2050. The proposed EU Taxonomy basically also rules out natural gas based transport solutions (Table 7: 1.4.3, 5.2.5). The Green Industry Catalogue also promotes nuclear power which in the proposed EU Taxonomy is, at least for now, seen ineligible.

Table 7. *Non-aligning (and partly aligning, partly not) activities in the Green Industry Catalogue and the proposed EU Taxonomy*

Legend: Not aligned, Partly aligned, partly not aligned

Green Industry Catalogue categories	Comments on Green Industry Catalogue activities vs. proposed EU Taxonomy
1 Energy-saving and environmental protection industry 1.1 manufacture of high-efficiency energy-saving equipment	1.1.1 **Energy-saving boiler manufacturing**: Includes fossil fuel, biomass and waste based boilers which are not mentioned in the EU Taxonomy list of ”greening by" activities (21.1. Manufacture of Low carbon technologies). Producing and selling especially fossil fuel based boilers could "lock in" these assets for longer term use which is seen by EU Taxonomy to negatively contribute to greenhouse gas emissions. 1.1.2 **Energy-saving kiln manufacturing:** Incl. technology (kilns and furnaces) which are not mentioned in the EU Taxonomy list of ”greening by" activities (21.1. Manufacture of Low carbon technologies) and are often based on fossil fuel use and thus producing and selling more of these could "lock in" fossil based assets for longer term use which is seen by EU Taxonomy to negatively contribute to greenhouse gas emissions.
1 Energy-saving and environmental protection industry 1.4 new energy vehicles and green ships manufacturing	1.4.3 **Green Shipbuilding:** Includes aligned "greening by" activities: electric ships, solar energy and wind energy which fulfil EU Taxonomy "zero direct emissions waterborne vessels" requirement. However, also includes not clearly aligned activities (green shipbuilding such as energy-saving and new-energy construction ship): not clear if these are meant to be zero direct emission based ships as required by EU Taxonomy. Furthermore, includes non-aligned activities (natural gas ships which have not zero direct emission as required by EU Taxonomy).
3 Clean energy industry 3.1 manufacture of new energy and clean energy equipment	3.1.5 **Nuclear Power Equipment Manufacturing:** EU Taxonomy excludes nuclear energy at this stage. 3.1.6 **Unconventional oil and gas exploration and mining equipment manufacturing:** Based on EU Taxonomy it must be technically feasible to reach zero greenhouse gas emissions for activities beyond 2050, which implies that unabated (without carbon capture and sequestration) fossil fuel combustion will not be eligible. Thus for activities which go beyond 2050, it must be technically feasible to reach zero emissions. Coal-fired power with carbon capture and sequestration may qualify in the short-term, but new coal plants generally have lifetime of 40 years or longer (and thus even with carbon capture and sequestration, investment in new coal use won´t be accepted). Unabated natural gas-fired power generation is not expected to meet required threshold after 2050. Gas-fired power with carbon capture and sequestration may qualify even after 2050. In line with this, especially manufacturing of equipment that contributes to continuing future supply/use of fossil fuels is not aligned with EU Taxonomy. 3.1.7 **Marine oil and gas exploration equipment manufacturing:** see 3.1.6 3.1.9 **Gas turbine equipment manufacturing**: see 3.1.6
3 Clean energy industry 3.2 construction and operation of clean energy facilities	3.2.5 **Nuclear power plants Construction and operation:** EU Taxonomy excludes nuclear energy at this stage. 3.2.6 **Construction and operation of coalbed methane (coal gas) extraction and utilization facilities**: see 3.1.6
3 Clean energy industry 3.3 clean and efficient utilization of conventional energy sources	3.3.1 **Clean fuel production:** Promote directly continuing production of fossil fuels (fuel oil, crude oil, gasoline, diesel) which is not aligned with EU Taxonomy (see 3.1.6. for reasons) 3.3.2 **Clean coal utilization:** Promote directly continuing production and utilization of coal which is not aligned with EU Taxonomy (see 3.1.6. for reasons) 3.3.3 **Clean coal production**: see 3.3.2
3 Clean energy industry 3.4 efficient operation of energy systems	3.4.4 **Coal-fired generator set peaking flexibility reconstruction project and operation**: see 3.1.6
5 Green upgrading of infrastructure 5.2 green transportation	5.2.5 **Construction and operation of charging, power exchange, hydrogenation and gas filling facilities:** Chinese standard incl. charging infra based on electricity, hydrogen and natural gas whereas the EU taxonomy (“24.4 Infrastructure for low carbon transport”) seems to rule out natural gas charging facilities.

4.1.1.2.2 Unclear alignment

The detailed results of the analysis are presented in Appendix 4: Taxonomy Comparison – Unclear alignment.

The unclear alignment in the two taxonomies relates to the different treatment of fossil fuels (categories 1.1.7, 1.3.1, 1.6.5, 1.7.1, 2.1.2, 3.4.5, 5.2.7 & 5.4.1) and nuclear (1.2.6), as well as to generally vaguely defined categories in Green Industry Catalogue (2.1.4, 2.2.3, 3.4.1, 3.4.6, 5.1.2, 5.1.4, 5.1.6, 5.4.2 & 5.4.3). Also, the proposed EU Taxonomy is still unclear about treatment of biomass energy use (1.3.8, 3.1.3) and odour pollution (1.6.13), as well as how green services (6.1.1 to 6.5.6) are treated, all causing questions about alignment. The Green Industry Catalogue also contains elements that could be considered to have more a social impact than environmental (1.6.14, 4.1.10 & 5.6.1 to 5.6.6) whereas the proposed EU Taxonomy focuses only on the environmental objectives.

4.1.2 Interviews

Based on both interviews, the major sticking point in finding a common view on green bond standard would especially be China allowing clean coal projects to be financed by green bonds. It was viewed that the EU investors would not be willing to buy such green bonds as using coal always implies greenhouse gas emissions. In line with this, it was also mentioned that fossil fuel finance in general would become a sticking point in the EU-China discussion as some EU investors would not accept any fossil fuel finance as green. Furthermore, China allowing green bonds to finance nuclear energy could also become a sticking point in finding a common language. However, it was mentioned that treatment of nuclear is still under discussion also within the EU: it reduces greenhouse gas emissions but the resulting nuclear waste is seen as a problem by many. It was also mentioned by one of the interviewees that where the proposed EU taxonomy is aligned with Paris Agreement climate targets, the Chinese Taxonomy is not, which is an interesting "conflict" in the policies.

One of the interviewees emphasized that the lack of green bond market transparency is a major barrier for international players in China. Generally the market standard is that second opinion is given only at the green bond issuance stage of the bond whereas use of proceeds and impact auditing after the issuance are not commonly done (goes both for the EU and China at present[16]). In China this kind of lack of follow-up can be challenging as the verifier cannot

[16] Author´s note: Proposed EU Green Bond Standard (TEG, 2019a) imposes more stringent rules on the issue.

always be sure that different green bond regulations are really implemented/enforced: when the verification is only done at the issuance there is no follow up to make sure that initial use of proceeds management and impact assessment are really done properly after the bond issuance.

Overall, it was also brought up during the interviews that the EU Taxonomy is still at a proposal stage and there may be internal pressure to change it. The on-going EU internal discussion around green bond standard and taxonomy is, according to interviews, focused on some controversial issues such as the treatment of nuclear (as mentioned above), and treatment of fossil fuel based projects. It was also commented that the taxonomy thresholds are still developing, and there may be pressure from certain idustries to have their operations considered in the EU taxonomy, because if excluded, these industries may face higher capital costs in the market if their business is seen inherently non-green.

4.1.3 Media analysis

The media analysis confirms the interview results in terms of clean coal generally not seen aligning with international green bond norms. According to Lee (2019, para. 5): “Allowing green bonds to finance coal-related projects was a major sticking point between the EU and China, with existing European standards prohibiting any coal financing while Chinese rules allow half of green-bond proceeds to be used for that purpose.”

Also according to Sean Kidney, chief executive of the Climate Bonds Initiative, the main concern by international investors is the inclusion of coal-fired stations in the Chinese green projects list (Chong, 2019). About 10% of green bonds in China currently have some coal lending included, and according to Kidney, the international investors are not interested in these (Chong, 2019). Generally, clean coal projects are currently not eligible to be funded by green bonds anywhere else in the world than in China, as despite using enhanced technologies to cut air pollution, the clean coal projects leave carbon emissions largely unaccounted for (Jing, 2019). Also based on Stanway & Galbraith (2019), the inclusion of “clean coal” in a 2015 central bank list of technologies eligible for green bonds has put China at odds with global standards, which is viewed as a point of conflict for many environmental groups and some international investors. Green bonds have already financed several big coal and coal-to chemicals projects in China despite criticism from environmental groups (Stanway & Galbraith, 2019).

Sean Kidney, chief executive of the Climate Bonds Initiative, lists further challenges in the Chinese green bond market that concern global investors (Chong, 2019). Some 10% of Chinese green bonds have not provided public information on the use of the proceeds according to Kidney, and Kidney states that "Until we can confirm where the money is going, we are not willing to call them international green bonds" (Chong, 2019, para. 17). Furthermore, under the NDRC green bond guidelines for state-owned enterprises, 50% of the funds raised can be used for working capital which is also seen as a problem by Kidney as "Under international norms, you have to assign 100% of the bond to green assets or green projects" (Chong, 2019, para. 18). Despite the non-alignments viewed by the international investors, Kidney also states that "Chinese regulations are the toughest in the world by a mile. The regulators, particularly by PBoC, require quarterly reports on the disbursement of proceeds from green bonds" (Chong, 2019, para. 19).

According to Guarascio (2019) the decision on EU green bond standard was delayed until the end of 2022, based on an agreement of the EU governments in September 2019. The agreement text does not exclude any economic activity from being listed as green, which could mean that investments meant to reduce the environmental impact of plants seen as highly polluting, or nuclear reactors could be seen as green (Guarascio, 2019). The decision does not thus follow the June 2019 recommendations from the EU TEG group - that are a vital part of the alignment-analysis in this Thesis - which advised excluding nuclear and coal-fired plants from the EU taxonomy (Guarascio, 2019). The text agreed by EU governments needs still, however, European Parliament´s approval, which earlier wanted to rule out nuclear and coal investments from green projects (Guarascio, 2019).

Furthermore, there has also been some recent "back and forth" debate on willingness of some Chinese actors to remove clean coal from the green bond definitions. The Green Industry Catalogue (NDRC, 2019a) analysed in detail in this Thesis is one of the two main Taxonomies used today in China to define the green bond eligible projects. It was analysed here as it is supposed to become the basis for all types of green bonds issued in China. The other green bond taxonomy used in China is published by the PBoC, and based on interview with Ma Jun, chair of the China Green Finance Committee under PBoC, in 2017 (Han, 2017), possibility to change the Chinese Taxonomy[17] so that it would better align with the EU views on coal use was brought up. According to Stanway & Galbraith (2019), in early 2019, before the Green

[17] here presumably meaning the taxonomy published by the PBoC

Industry Catalogue publishing, industry sources in China had again stated that the PBoC is planning to revise its green bond eligibility list by removing clean coal projects. Based on Jing (2019), following global standard could attract global investment to China, which is on PBoC preference, but endorsing coal projects in its green financing guidelines would recognize the importance of the domestic coal industry, and based on Jing (2019), PBoC was expected in the end allow green bond financing for clean coal projects. Also according to Lee (2019) China has been showing willingness to agree to the European position on the clean coal point which shows how seriously it takes the talks (Lee, 2019). Lee (2019, para. 7) brings out "increasingly contentious atmosphere between Brussels and Beijing" in other than green bond issues as one possible reason for Chinese flexibility. Agreement on common issuance rules for green bonds would ease, at least temporarily, pressures on the bilateral relationship in other politically sensitive current issues such as China's restrictions on foreign bidding in the public projects (Lee, 2019).

4.1.4 Synthesis & Reflections

Based on the standard comparison, interviews and media analysis, there are current critical issues standing in the way of finding a common EU-China understanding on green bond standard rules and definitions. Therefore the research hypothesis is confirmed by the analysis results, and it can be concluded that the domestic (Level II) win sets (as defined originally by Putnam, 1988) of China and the EU do not currently overlap due to some non-aligned green definitions and differences in how strict the rules are on green bond issuing, reporting and verification. These can be viewed to stand in the way of finding a common EU-China (Level I) view in green bond standards at least in the shorter term.

Based on the comparison of rules on green bond issuing process, reporting and verification, the proposed EU Green Bond Standard rules are the strictest in the requirements and the most transparent, whereas the Chinese standard for Green Enterprise Bonds has the least strict requirements and transparency. However, there is also variation in China in the green bond rules on issuing process, reporting and verification depending on the type of green bond. Nevertheless, still the proposed EU Green Bond Standard provides the most stringent and transparent rules. Based on the media analysis, the lack of public information on the use of the proceeds that some Chinese green bonds have, and loose rules on working capital in the NDRC regulated green bonds are generally seen as problems under the international norms. The lack

of transparency in the enforcement of green bond rules in China is also brought up as a major barrier for international players in China by a person interviewed.

When it comes to the comparison of the green bond taxonomies, some clear differences can be found in the proposed EU Taxonomy and China´s Green Industry Catalogue. Where the Green Industry Catalogue includes the clean coal energy use, production, and manufacturing of equipment for clean coal use as eligible categories, the proposed EU Taxonomy basically rules out all coal related activities. Other major differences, besides clean coal, are the Green Industry Catalogue promoting production and use of natural gas, and in some occasions also oil, and manufacturing of related technologies, which are basically ruled out in the proposed EU Taxonomy. The proposed EU Taxonomy, however, allows natural gas use but basically only in the short term for power & heat production. The Green Industry Catalogue also promotes nuclear power which in the proposed EU Taxonomy is, at least for now, seen ineligible for green bond financing.

Overall, the non-aligning green definitions found based on the taxonomy comparison match with the findings from the interviews and media analysis. According to the interviews and media analysis, the major sticking point in finding a common view on the activities/projects eligible for green bond financing would especially be China allowing clean coal projects to be financed by green bonds. It was also mentioned during the interviews that fossil fuel finance in general and China allowing green bonds to finance nuclear energy could become sticking points in the EU-China discussion.

What was interesting, however, is that based on the taxonomy comparison, majority (64%) of the total 211 Green Industry Catalogue categories can be viewed to align with the EU Taxonomy proposal´s green definitions. Furthermore, only 6 % of the categories can be viewed not to align, and 1% of the categories can be considered to partly align and partly not. Also, interestingly, for a rather high share (30%) of the categories the alignment is not clear. It can thus be viewed that especially the media discussion focuses on the non-aligning issues whereas in reality it seems that quite a high share of the green definitions actually align. The rather high share (30%) of categories for which the alignment is not clear is also an interesting finding. This group includes categories where it is simply not clear if the taxonomy categories are aligned, but also categories which can be deemed partly aligned, but partly unclear, and categories that are clearly not aligned in parts, but where the alignment in some parts is unclear. Unclear definitions generally relate to either vaguely defined categories in the Green Industry

Catalogue or the proposed EU Taxonomy still being unclear about treatment of some activities. The Green Industry Catalogue also contains elements that could be considered to have more a social impact than environmental whereas the proposed EU Taxonomy focuses only on environmental objectives.

Overall, it was brought up during the interviews that the EU Taxonomy is still at a proposal stage and there may be domestic pressure to change it. The on-going EU internal discussion around green bond standard and taxonomy is, according to interviews, focused on some controversial issues such as the treatment of nuclear and treatment of fossil fuel based projects. The outcome of the discussion may influence also the final alignment of the EU-China green bond standards and definitions and thus the discussion on the common understanding. Furthermore, based on the media analysis, there has also been some recent "back and forth" debate on willingness of some Chinese actors to remove clean coal from the green bond definitions, however with the most recent view based on the media analysis was that the clean coal would remain eligible for green bond financing.

What I also found interesting during reading the material for the Thesis is that vast majority of the Chinese green bonds actually already align with the current international norms for green bonds, despite the current Chinese green bond standards and taxonomies generally allowing more loose green definitions and rules. In 2018 only 26% (USD10.8bn) of all Chinese green bonds issued were not in line with international green bond definitions[18], although being aligned with Chinese official green bond catalogues and guidelines (CBI & CCDC, 2019). Furthermore, based on an interview, many Chinese green bond issuers already align with international norms to attract as wide investor space as possible. This makes one wonder if the Chinese green bond standards and taxonomies could be made more stringent as the majority of the green bond issuers certainly already follow the international norm.

[18]Of the excluded bonds in 2018, 50% were used to finance projects that are not aligned to international green definitions, incl. retrofits of fossil fuel power stations, "clean" coal, coal efficiency improvements, controversial hydro projects or projects without power density disclosure, etc. The green bonds not meeting the international norm of at least 95% of the proceeds being linked to green assets or projects represented 46% of the exclude volume in 2018. Bonds without sufficient information to determine alignment with green bond definition accounted for 2% of all excluded bonds from Chinese issuers in 2018. (CBI & CCDC, 2019).

4.2 Preferences behind China´s regulation on green bond eligible activities

The first part of this sub-chapter focuses on the findings from the interviews, and the second from the media analysis. The last part of the sub-chapter includes a synthesis of the results and focuses on the reflections based on these.

The research question addressed in the analysis is what could be the domestic (Level II) preferences impacting which projects/activities are seen eligible for green bond financing in China. The hypothesis is that as China´s domestic (Level II) preferences behind the environmental and climate policy currently seem to favour air and water pollution over the greenhouse gas emission reductions (see Chapter 2.3.2.2), these preferences are also likely to be reflected in the definitions of green projects eligible for green bond financing.

4.2.1 Interviews

Based on the interviews, China´s development pathway and resource base are quite different from the EU´s. In the green finance context, China has for example vast coal resources and increasing energy demand in contrast to the EU. Thus the development stage and resource base differences are likely to impact the green definitions (and climate negotiations). With these kinds of differences, it may be hard to find international common definition for green.

Based on the interviews, it was also viewed that growth and stability of the domestic economy are at the moment more important to China than the green issues. There would be domestic pressures and a risk of social unrest if economy slows down, and thus economic growth and stability are high on the agenda. As especially coal is still an important fuel and employer in China, it was viewed that China cannot afford to remove the promotion of coal from its list of eligible technologies for green bond financing. It was also viewed that in general the development of capital market has higher priority than the green finance development in China. Also, in was mentioned that China not being a democracy allows/forces the rules to come from upward, whereas in democratic system in the EU makes the dynamics different

Based on the interviews, China´s priority in environmental policy issues is pollution, which is followed by the water (scarcity) issues and only after that the greenhouse gas emissions. The first two are high on political agenda and rather openly discussed. It was also viewed that the EU is at different stage of development, and can focus on greenhouse gas emissions as most domestic pollution and water issues have already been addressed since the 1970s. However, it

was also pointed out that the EU has “exported” emissions elsewhere, including to China, and if taking into account the greenhouse gas emissions linked to imported goods, these consumption based emissions of Europeans would be high.

4.2.2 Media analysis

The findings from the interviews are confirmed by the media analysis. According to Chong (2019) green finance has become central to China’s attempts to green its economy and to clean up its degraded environment, both for economic and public health reasons. China is also turning to green finance to build its Belt-and-Road projects (Chong, 2019).

Based on an interview of Ma Jun, chair of the China Green Finance Committee, there are priority differences in China and Europe related to the green definitions (Han, 2017):

> For developing nations such as China, it’s not just about reducing carbon emissions – we also want to deal with a range of environment issues, such as air, water and soil pollution. Some of those issues aren’t significant problems in Europe. So when defining green bonds, Europe and China have different priorities. (para. 20).

Furthermore, Ma Jun states: “Defining green finance isn’t just a matter of basic technology, it also reflects a nation’s environmental protection priorities” (Han, 2017, para. 21). According to Ma Jun, these different priorities are a reason for controversies regarding e.g. clean coal projects being financed by green bonds in China but not commonly accepted internationally (Han, 2017). Moreover, according to Ma Jun (Han, 2017):

> China needs to prioritise reduction of air pollution, so it’s going to put a lot of effort into reducing emissions of sulphur dioxide and nitrogen oxides. Those come primarily from coal-fired power generation, but can be reduced by the use of sulphur and nitrogen scrubbing technologies. If your priority was reduction of carbon emissions, you’d ban coal-fired power to bring about zero emissions. (para. 21).

Related to the coal discussion, Premier Li Keqiang recently even urged energy officials to promote clean coal-fired power and clean mining (Stanway, 2019b). Also Lin Boqiang, dean of the China Institute for Energy Policy Studies, sees the role of coal important in the slowing economy: “Since coal is still a major resource, we will continue to rely on coal when we need it - and right now for instance, the economy is slowing and renewables are still relatively weak” (Stanway, 2019b, para. 19).

Also Zhao Yingmin, China's vice environment minister, brings out the multiple policy challenges, stating that "We continue to work hard to advance the fight against climate change, but on the other hand, we are indeed facing multiple challenges such as developing the economy, improving the people's livelihoods, eliminating poverty and controlling pollution" (Stanway, 2019b, para. 4).

4.2.3 Synthesis & Reflections

Based on the interviews and media analysis, China´s domestic (Level II) preferences behind the definitions of green projects/activities eligible for green bond financing currently favour pollution reduction over the greenhouse gas emission reductions. The findings thus confirm the hypothesis that China´s domestic (Level II) preferences behind the environmental policy currently seem to favour air and water pollution over the greenhouse gas emission reductions (see Chapter 2.3.2.2) which is reflected in the definitions of green projects eligible for green bond financing.

Additionally, the findings from the interviews and media analysis also emphasize the importance of ensuring the economic growth in China which can be closely connected to allowing green bond financing to be used for clean coal projects. Coal is seen as a continuing important economic resource and thereby its clean use can be viewed to be included in the list of activities that can receive green financing. Furthermore, based on interviews, ensuring clean water supply can be viewed as a high environmental (and social) priority in China. Therefore, the Chinese green bond definitions can be viewed to focus on activities that contribute foremost to these goals and only secondary to climate change mitigation. Based on the interviews, China´s vast coal resources and increasing energy demand are in contrast with the EU´s. Thus the development stage and resource base differences are likely to impact the green definitions (and climate negotiations). With these kinds of differences, it may be hard to find international common definition for green. And as Stanway & Galbraith (2019) highlights, allowing green bonds to finance clean coal may limit foreign involvement in the market, but it can also be viewed that green financing is still required to help clean up China's coal sector, as Peter Corne, managing partner at legal firm Dorsey & Whitney in Shanghai, states.

In fact, China currently has almost half of the global total of installed coal-fired power capacity, and its coal fleet is one of the youngest in the world, with most of its plants capable to run for another three or four decades (International Energy Agency, 2017). China is also effectively

driving the ongoing expansion of the global coal fleet (Shearer et al., 2019). Coal consumption has continued to increase in line with a rise in overall Chinese energy demand, but at the same time coal's share of the country's total energy has reduced from 68% in 2012 to 59% 2018 along with government plan, and it is predicted to fall to 55.3% by 2020 (Stanway, 2019a). However, to meet the reductions required in coal power for holding global warming well below 2°C, China needs to reduce its coal power capacity over 40% (from current 1,027 GW to 600 GW or less) by 2030, which is incompatible with domestic industry groups´ proposed coal fleet expansions of 20% to 40% (Shearer et al., 2019). Furthermore, replacement of old coal-burning factories with more efficient and clean ones takes time and is costly, and replacement of the many energy-inefficient buildings will be slow, and thus there is continuous trade-off between economic development and reducing greenhouse gases (Pearson, 2019). Connected to that, Keohane & Oppenheimer (2016) view that China´s (and other BRIC countries´) main focus in fulfilling climate change mitigation commitments is on economic growth, cost minimization and maximization of flexibility.

Still, despite the challenges, in 2019 China brought down its carbon intensity by 46% from 2015-2018, beating its target by two years, and some forecasts estimate that CO_2 emissions could peak already by 2022, not by 2030 as targeted (Stanway, 2019b). Furthermore, there are also domestic groups that see economic opportunity and comparative advantage in producing new climate change-related products, such as solar panel industry in China (Keohane & Oppenheimer, 2016). Thus, China has developed substantial international markets for renewable energy leveraging on own extensive deployment, favourable government policy and market advances (Pearson, 2019). Emphasis on clean energy manufacturing and technology development can, therefore also be viewed as an industrial and innovation policy supporting economic growth and creation of new industries that could become internationally dominant (Pearson, 2019).

4.3 Relevance of EU-China green bond dialogue on cross border finance

The first part of this sub-chapter focuses on the findings from the expert interviews, and the second from the media analysis. The last part of the sub-chapter includes a synthesis of the results and focuses on the reflections based on these.

The research question addressed in the analysis is would, in the EU-China context, a potential common understanding on green bond definitions and rules facilitate more cross-border flow

of green financing. The hypothesis is that other market barriers hindering cross-border flow of financing would still exist even in case of common green bond definitions and rules. Thus even if the EU and China domestic (Level II) win sets would overlap in green definitions and rules, this does not automatically imply that cross-border flow of green financing would grow significantly as other barriers could still exist.

4.3.1 Interviews

Having a common green definitions would, according to the interviewes, benefit both China and the EU. It was mentioned during the interviews that at present the Chinese green bond issuers going abroad need to, by law, follow the Chinese green bond standards and taxonomies, but by investor demand the internationally aligned standards, and thus there is a need for a double standard. Having common standard would ease that burden and could enhance cross-border trade of green bonds. However, according to an interview, this need to comply with two different standards has not stopped some Chinese green bond issuance in the EU – these Chinese issuers seem to have paid a lot of attention to ensure transparency, and have picked only the most clearly green projects for issuance in the EU. Furthermore, based on the interview, many Chinese green bond issuers already align with international norms to attract as wide investor space as possible.

According to an interview, the non-aligning views on some green bond definitions is not the highest priority issue to solve as the Chinese are most likely not willing to compromise on the clean coal, whereas even with no capital market barriers and fully open market, clean coal would still be a problem for the EU investors.

The main barrier in the green bond market, according to an interview, is that China´s capital market is at least at the moment quite closed. This was viewed to be a bigger green bond market barrier than having different green bond rules and definitions of green. Firstly, according to the interview, both the Chinese and the EU green bond issuers and investors face capital controls imposed by China when dealing cross-border. For the EU players this basically means that proceeds in RMB cannot be brought out of China and thus there is need to invest the capital in China. For some foreigners that have subsidiaries or business in China this may make sense, but for the most it doesn´t. The same goes also for the Chinese, as China´s capital controls restict transferring money to China from the EU. However, according to the interviewee, the Chinese capital market is slowly opening, and this may change in the future. Secondly,

according to the interview, the financial market standards are different in the EU and China which also hinders the cross-border market due to extra costs. Foreign (green) bond issuers in China need to follow the local Chinese standards on e.g. accounting and credit rating, whereas elsewhere, including in the EU, the default is to use different (international) standards/practises. For a foreign green bond issuer, the need to employ and to comply with these Chinese financial market standards means extra costs (e.g. need to hire a Chinese accounting firm). The same goes also for the Chinese financial market players, such as green bond issuers, when they access markets with different standards than their own.

Overall, the EU-China green bond dialogue was viewed positively by the interviewees. It was mentioned that even if a common green bond language maybe at the moment far-fetched, it is still good to have the discussion and dialogue to cooperate in Climate Change issues. It was further commented that the US withdrawal from Paris Agreement has made the EU to turn to China which may also be a reason for having the dialogue even if challenging. The green bond dialogue was also viewed useful as it increases the dialogue participants´ understanding and knowledge on the issues at hand.

4.3.2 Media analysis

Confirming the interview findings, benefits are seen if common green bond definitions would exist. Having common green definitions is specifically viewed to reduce transaction costs, based on the media analysis.

In an interview regarding the EU-China green financing relations (Han, 2017), Ma Jun, chairman of China Green Finance Committee, states that:

> In technical terms, many green financial products in the West partially overlap with those in China. If we designed a system where green products in Europe were included as a sub-category of China’s green products, we’d reduce trading costs and the expenses international investors incur in the search for projects. (para. 19)

Furthermore, Ma Jun states that without a green bond translation system companies issuing green bonds in each other's markets would need to get verification and certification from both sides, resulting in high costs (Liqiang, 2018). With the translation system, duplication and the high costs involved could be avoided which would promote the cross-border flow of green finance (Liqiang, 2018). Also according to Lee (2019) an EU-China agreement on green bond

standards would enhance the credibility and the appeal of the green bonds for investors and thus likely increase their issuance.

Media analysis does not specifically bring out other green bond market barriers than the barrier of having different green bond rules in the EU and China. However, the media analysis findings confirm the interview findings when it comes to the signals that the Chinese financial (and bond market) is generally opening up. According to Zhao et al. (2019), PBoC´s Deputy Governor Pan Gongsheng recently promised that China is to push ahead with opening of its bond market to foreign investors as it is crucial for the development of the nation's financial markets. According to Zhao et al. (2019), Pan Gongsheng also states that China welcomes overseas entities that want to raise money locally by panda bonds, and that the proceeds could be used freely inside and outside the country, although he doesn't understand why anyone would raise RMB in China and immediately convert it into foreign currency.

4.3.3 Synthesis & Reflections

Based on both, the interviews and media analysis, it is viewed that common green bond standard and definitions could enhance EU-China cross-border trade of green bonds as the current need for double-standard would be removed. This would, based on the media analysis, reduce the transaction costs. Based on the interviews and the media analysis, this would benefit both the Chinese and the EU green bond market players. However, the main barrier in the green bond market, according to an expert interview, is that China´s capital market is at least at the moment quite closed. This was viewed to be a bigger green bond market barrier than having different green bond rules and definitions of green. However, according to both the interviews and media analysis, the Chinese capital market is slowly opening, and this may mean positive changes in the situation in the future.

According to an interview, the lack of common standard and definitions has not meant that no green bonds would be issued cross-border – especially many Chinese players have made sure to align not only with their own standards and taxonomies but also with the more strict international ones. This is supported by data from CBI & IDP (2019) indicating that in 2018 some 25% of the Chinese internationally-aligned green bonds were issued overseas markets, especially through Hong Kong and European Stock Exchanges. At the same time, it seems that the share of foreign investors and issuers in the China´s green bond market is very low - the share of foreign investors in the current Chinese domestic green bond market is not even

reported, and the green panda bonds consist only less than 1% of the total green bonds outstanding in China (CBI & IDP, 2018). Based on the literature review carried out for the Thesis, I generally thought that the foreign access to the Chinese green bond market seems to be heavily regulated, complicated and bureaucratic.

When it comes to specific market barriers, according to an expert interview, both the Chinese and the EU green bond issuers and investors currently face capital controls imposed by China when dealing cross-border. This hinders cross-border green financing flows. Furthermore, the financial market standards are different in the EU and China which currently means extra green financing costs for both parties when dealing cross-border. These findings are supported by the earlier literature review findings; according to Malkin & Li (2019) China has never fully opened its financial system to global markets despite actively utilizing global capital markets, and plans for capital account liberalization have been reversed several times and the policies for financial market opening have been peculiar, even contradictory. Feng et al. (2019) also bring out similar market barriers that come across based on the analysis, from the perspective of the Chinese bond market: Feng et al. (2019) view that reasons for low foreign bond investment in China are the closed financial market in general, fragmented and often changing regulation and policies, lack of a developed, market-oriented default mechanism, low liquidity of the secondary bond market, as well as inconsistency in the accounting, auditing, netting, and rating principles inside and outside of China. Feng et al. (2019) also bring out that the general panda bond in China market is still very small and immature, with weak regulation and low transparency being the main market development barriers.

5 Conclusions

EU-China search for common understanding on what kinds of activities should be eligible for financing by green bonds started recently. The mutual understanding could, according to the negotiation parties, facilitate greater flows of cross-border finance for environmentally friendly projects and activities. As China and the EU together lead the global green bond market, a common understanding on green bond rules could even facilitate much sought after global harmonization of green bond rules.

This Thesis answers the following research questions to examine how realistic and influential the EU-China search mission for common understanding on green bonds is:

1. Are there critical issues standing in the way of finding a common EU-China understanding on green bond standard rules and definitions?
2. What could be the domestic preferences impacting which projects/activities are seen eligible for green bond financing in China?
3. Would, in the EU-China context, a potential common understanding on green bond definitions and rules facilitate more cross-border flow of green financing?

As no comparison of the most recent Chinese and proposed EU green bond standards and taxonomies has been published yet, the Thesis fills that gap by providing a comparison. Moreover, a gap in research on green bond market barriers in the context of EU-China, and on drivers behind the green bond definitions in China is filled by the Thesis.

The Thesis analysis is based on a qualitative multimethod approach combining green bond standard document comparison, media analysis and expert interviews. The work was carried out applying a liberal two level game approach (Putnam, 1988), from the field of International Political Economy, which has proved useful when analysing domestic-international dynamics present in international negotiations on e.g. energy, climate and environmental policy.

Based on the green bond standard comparison, interviews and media analysis, there are current critical issues standing in the way of finding a common EU-China understanding on green bond standard rules and definitions. Especially clean coal being seen as “green” in the Chinese policy but not in the EU, also other fossil fuel based activities and possibly also activities related to nuclear energy may be sticking points in the dialogue. Based on the comparison, the proposed EU Green Bond Standard provides the most stringent and transparent rules on green bond

issuing process, reporting and verification, whereas in China the requirements vary depending on the type of green bond and regulator. Therefore the domestic (Level II) win sets (as defined by Putnam, 1988) of China and the EU do not currently overlap which can be viewed to stand in the way of finding a common EU-China (Level I) view in green bond standards at least in the shorter term. Based on the interviews and media analysis, China´s domestic (Level II) preferences behind the definitions of green activities eligible for green bond financing currently favour pollution reduction over the greenhouse gas emission reductions. Additionally, the findings suggest that the need to ensure economic growth and ensure resources for growing energy demand in China are also closely connected to green bond definitions as allowing green bonds to finance e.g. clean coal projects has not only environmental but also socio-economical motivations.

Despite the differences, what I found surprising, was the high share of aligning definitions of what can be considered "green" in the Chinese and proposed EU green bond taxonomies. This does not come across, for example, from media discussion which mainly focuses on the sticking points rather than aligning views. Moreover, it was also surprising that quite many of the definitions of activities seen as "green" were somewhat unclear indicating a need for better specification and clarity both by the EU and Chinese regulators.

Also, despite the differences in views on what is "green", the EU-China green bond dialogue was viewed positively by the interviewees; even though finding a common green bond language maybe at the moment far-fetched, it is still good to have dialogue for climate change cooperation purposes and to increase the dialogue participants´ understanding and knowledge on the issues at hand.

As the standard comparison was conducted based on unfinished, proposal stage green bond standards and taxonomy documents in the EU, the natural next research step would be to carry out the comparison using the final standard and taxonomy documents. Also, as the findings were based on rather a small number of interviews, and analysis of selected news articles, more interviews, also with Chinese market players, could help in further exploring the issue. However, despite the quantity of the interviews was rather small, I found the quality excellent.

Moreover, it would be interesting to study not only the environmental policy preferences of China but also of the EU – in this way the analysis could be sharpened further. The results may still already help to facilitate a wider discussion in developing a more unified green bond

market especially because the role of both EU and China is significant in the global green bond market.

Finally, the findings from both, the interviews and media analysis, suggest that common green bond standard and definitions could enhance the EU-China cross-border trade of green bonds as the current need for costly double-standardization would be removed. This would benefit both the Chinese and the EU green bond market players. However, the main barrier in the green bond market, as suggested by the analysis, is that China´s capital market is at the moment quite closed which may be a bigger green bond market barrier than having different rules for green bonds. Specifically, the analysis suggests that capital controls imposed by China and different financial market standards in the EU and China would hinder the green finance flow even in a case of fully aligned green bond standards and taxoniomies. However, according to both the interviews and media analysis, the Chinese capital market is slowly opening, meaning possible positive changes in the situation in the future.

Again, these findings were based on rather a small number of interviews, and analysis of selected news articles, and thus credibility could be added e.g. by more expert interviews. Nevertheless, the results may still help to bring light to what should be prioritized by the EU and China in the bilateral green finance dialogue to facilitate more cross-border green finance. In general, I think that it would be extremely important to focus not only on dialogue around the common green bond standards but also on the other green financial market barriers, as this could truly facilitate much needed green finance expansion.

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Appendix

Appendix 1: Interview Protocol

Introduction

This is an Interview Protocol for my Master´s Thesis at University of Helsinki on EU-China relations in the green bond market. In my Thesis, I am focusing especially on EU-China green bond standard unification process and the market barriers the EU players face when accessing Chinese (green) bond market as issuers or investors.

You may find background information about the Thesis in the "Background of the Thesis" section, the planned interview questions in the "Interview Questions" section, a few notes and questions regarding confidentiality in the "Confidentiality" section and the sources in the "Sources" section.

Background of the Thesis

Since its launch in 2007, the green bond market has expanded rapidly, but still accounts only for less than 1% of total bonds outstanding globally (GFSG, 2016). When looking at the global issuance of internationally aligned green bonds, issuers from US, China and France topped the global list in 2018 (CBI & CCDC, 2019). It is notable, however, that if the EU is considered as a one entity, the EU issuers combined surpassed the US and Chinese issuers[19] in 2018.

Although there seems to be a rather good general understanding on what is the purpose of the green bonds, still the exact definition of "green" is not always that clear. For instance, according to Breen (2017), the growth in green bond issuance has not yet led to internationally binding standards or single set of criteria by which issuers could establish the integrity of the "green" label, and investors could verify the integrity of a green bond. At current, a bond generally becomes "green" when an issuer self-labels the bond as "green" according to the criteria mostly selected by the issuer (Breen, 2017). Consequently, several prominent market players have recently increasingly advocated for more transparency, credibility and consistency in the green bond market to protect the "green" label integrity (e.g. G20 Sustainable Finance Study Group, UNDP). Furthermore, other market barriers have been identified hindering the growth of green bond market globally (e.g. by GFSG, 2016).

Both the EU and China have taken a leading role in developing global green financial market to address the climate change challenge (EIB & CGFC, 2018). China has also recently been promoting RMB internalization (e.g. Zeng, 2019) and opening of its financial market. The current public EU-China dialogue specific to green bond market is focused on finding a common language on green bond standard definitions (EIB & CGFC, 2018). The EU is on its way to create a common voluntary EU standard for green bonds (European Commission, 2019), whereas the first Chinese green bond standard documents were published in 2015 (OECD,

[19] issuers domiciled in People's Republic of China

ICMA, CBI & GFC, 2016). According to Ma Jun, chair of China Green Finance Committee, developing compatibility between the EU and China green bond standards could even set a precedent for harmonization on a global scale (EIB & CGFC, 2018).

As the Thesis topic is EU-China economic relations, the theoretical background of the Thesis is within the International Political Economy. Looking at the bilateral EU-China relationship in regards to green bonds is relevant and important as the green bond issuers from EU and China lead the global market (CBI & CCDC, 2019) and both the EU and China have also taken a leading role in developing global green financial markets to address the climate change challenge (EIB & CGFC, 2018). The results of this work may help to bring light to the underlying factors and dynamics in the EU-China bilateral green bond standard dialogue, and may help to facilitate a wider discussion in developing a green bond market. To test my hypothesis and answer my research questions, I am planning to use a multimethod approach combining (standard) document comparison, interviews and media analysis.

Interview Questions

- **Green Bond Market barriers (EU-China-EU) in general:**

    1. What are the main **market barriers** for EU green bond issuers and investors in the Chinese domestic green bond market?
    2. What are the main **market barriers** for Chinese issuers and investors in the EU?
    3. Do you see **positive signals** in solving possible market barriers?
    4. If there would be, in theory, no barriers for EU investors and issuers in China´s green bond market, would there be a large **interest** to access the market and why?

- **Green Bond Market access (EU-China-EU):**

    5. Do you find that there is an **inbalance** in the green bond market access for Chinese actors in the EU vs EU actors in China? If yes, do you see positive signals in solving these?

- **EU and China on-going dialogue in translating their Green Bond Standards:**

    6. Who would likely **benefit** most from a common understanding on green bond standard? Why?
    7. What are the **major hurdles** in finding a common understanding? Why these exist?

- **Other**

    8. Would you like to mention **something else** about EU-China green bond relations that could be relevant?

Confidentiality

- I am planning to take notes of the interview, and can share these for acceptance after the interview. Would you like to see the notes for acceptance?
- I can keep your name and organization confidential, if needed. Would you like to have your name and organization name kept confidential?

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Appendix 2: Detailed Standard Comparison

	EU	China			
	EU GBS (proposal)	**Green Financial Bond**	**Green Debt Financing Instrument**	**Green Corporate Bond**	**Green Enterprise Bond**
Definition of green bond	Any type of listed or unlisted bond or capital market debt instrument issued by European or international issuer meeting following requirements: 1. Issuer's Green Bond Framework confirms bond alignment with EU-GBS 2. Proceeds, or an amount equal to such proceeds, are exclusively used to finance or re-finance in part or in full new and/or existing Green Projects 3. Alignment of bond with EU-GBS is verified by accredited Verifier	• Securities issued by financial institution[20] with purpose to raise funds to support green industry and to repay capital with interests by contract. • Issuers must fulfil certain qualifications to show responsible business conduct	• Debt financing instruments issued in interbank market by domestic or foreign incorporated non-financial enterprise ("Issuer") to raise proceeds specifically for green projects	• Green Corporate Bonds are used to support green industry projects. • Issuer shall not, in principle, be classified belonging in high pollution, high-energy consumption or other industries that are contrary to national industrial policy.	Corporate bonds used to: • promote green development, energy conservation and emission reduction, • address outstanding environmental issues, climate change • develop energy conservation and environmental protection industries, • guide and encourage social investment, • assist economic restructuring
Mandatory/ voluntary	Voluntary	Mandatory			
Regulating actors	Future EU Platform on Sustainable Finance could possibly give guidance	PBoC	NAFMII	• CSRC, • Shanghai & Shenzhen Stock Exchanges	NDRC
Use of proceeds classification	EU Taxonomy Regulation (Proposal[21]) Green Projects must (a) contribute substantially to at least one of the Environmental Objectives (b) not significantly harm any of the other Environmental Objectives	Green Bond Endorsed Project Catalogue (2015) but supposed to align with Green Industry Catalogue (2019)			Green Industry Catalogue (2019)

[20] Development banks, policy banks, commercial banks, finance company of enterprise group, and other financial institutions
[21] COM (2018) 353 final

	(c) comply with minimum social safeguards Also, 'Technical Screening Criteria' incl. principles, metrics and thresholds on sectors that are deemed environmentally sustainable				
Use of proceeds rules	Proceeds, or an amount equal to such proceeds, must be exclusively used to finance or re-finance in part or in full new and/or existing Green Projects which can incl. • Physical assets and financial assets such as loans • Green assets can be tangible or intangible, and can incl. share of working capital that can reasonably be attributed to operations • Any capex • Selected opex such as maintenance costs related to green assets, and R&D costs. Opex such as purchasing costs and leasing costs only in specific cases • Relevant public investments & public subsidies for sovereigns and sub-sovereigns Specific requirements related to look-back periods	• Proceeds must be invested in green projects within given timeframe • Unallocated proceeds can be invested in green bonds issued by non-financial business and money market instruments with good credit rating and market liquidity	• Proceeds shall be used toward developing and operating green projects, supplementing green projects related working capitals, or repaying green loans. • Green loans shall be bank loans or borrowings from other financial institutions earmarked for green projects • Issuer shall pledge to use full amount of proceeds toward green projects • Any change to use of proceeds during the outstanding period of bond shall be disclosed and must meet the requirements • Funds raised from green financial bonds (PBoC regulated) may be invested in Green Debt Financing Instruments	• Proceeds can be used for construction, operation, acquisition of green industry projects, or repayment of bank loans such as green industry projects	• issuers are allowed to use up to 50% of the bonds to raise funds for repayment of bank loans and supplementary working capital (in case of perfect debt service guarantees) • issuers with a principal credit rating of AA+ and a good operating position may use proceeds to replace high-cost debt generated by green project(s) under construction.
Reporting at issuance	Issuer shall provide description of Green Projects in: • Green Bond Framework (GBF) and • Green Bond legal documentation (e.g. in Prospectus or Final Terms). GBF shall be published before or at the time of issuance and must	Issuers shall submit to PBoC: 1) issuance application report; 2) prospectus incl. project categories, project selection criteria, decision-making procedures, environmental benefits, use and management of proceeds 3) written consent from authority	Issuer shall disclose in the registration documents details of green projects, incl,: (1) project overview; (2) statement that the green project meets applicable standards; (3) target environmental benefits of the green project	When applying for the issuance, prospectus should disclose: • types of green industry projects to be invested, • basis or criteria for project identification, • environmental benefit targets, • use plans for raised funds, and	Issuing enterprise may scientifically design green bond issuance plan

	be available until maturity of Green Bond. Issuer shall indicate following elements in the GBF: 1. Environmental Objectives of the Bond, and how issuer's strategy aligns with objectives, and rationale for issuing. 2. Process by which issuer determines how Green Projects align with the EU Taxonomy and, if applicable, technical screening criteria with support of Verifier 3. Description of Green Projects to be financed or refinanced 4. Process for linking the Bond to issuer's lending or investment operations in Green Projects. 5. Information on methodology and assumptions to be used for calculation of key impact metrics 6. Description of Reporting practices External Verification mandatory to confirm alignment of issuer´s GBF with EU-GBS before or at the time of issuance. Verification(s) must be made publicly available.	4) Recent financial reports and audit reports 5) Commitment letter of investing proceeds in green projects; 6) Other documents required by the PBoC Issuer allowed to issue green bonds shall 5 days before issuance, submit to PBoC: 1) Prospectus 2) Decision of the PBoC on administration of issuance 3) Signed underwriting agreement, underwriting syndicate agreement; 4) bond credit rating report and instructions on continuous tracking of credit rating 5) Legal opinion issued by issuer's lawyer 6) Other documents required by PBoC	To issue green note, the Issuer shall in the	• management systems Issuer should also provide a letter of commitment to raise funds for green industry project. In addition**Error! Bookmark not defined.**, issuer • must apply for pre-audit or listing condition confirmation, listing transaction or listing transfer of green corporate bonds • must provide other documents required by the Exchange • is encouraged to have an external review assessment on the proposed investment project	
Proceeds allocation & Impact reporting	• Need to report at least annually until full allocation of the bond proceeds and thereafter, in case of any material change in allocation. Final Allocation Report needs to be published upon full allocation and needs to be verified by external verifier	Issuer must • on quarterly basis disclose use of proceeds to the market • On annual basis, disclose a report on use of proceeds and related auditor's report from last year to PBoC Issuer is encouraged to:	Issuer shall disclose: • information in accordance with rules for Non-Financial Enterprises[22] and other applicable self-regulatory rules • half year and annual reports on use of proceeds and progress of relevant green projects through	During the existence of bond, issuer shall disclose in annual report • use of proceeds, • progress of green industry projects, and • environmental benefits Issuer is encouraged to before reporting period of green bonds, submit an evaluation opinion or	Not specified

[22] Rules for Information Disclosure on Debt Financing Instruments of Non-Financial Enterprises in the Interbank Bond Market

	• Need to report impact of Green Projects at least once during bond lifetime after full allocation of bond proceeds, and thereafter in case of material changes in the allocation. Verification of Impact Reporting is encouraged. • Verification(s) must be made publicly available	• Disclose 3rd party verifier´s assessment of green projects and associated environmental benefits in the bond duration, and to conduct follow-up assessment	NAFMII-recognized channels. Independent certification agencies are encouraged to: • Disclose "green rating" of green bond in their evaluation, and • Conduct follow-up evaluation and release periodic evaluation reports on bond´s contribution toward green projects & environment	certification report by independent professional assessment or certification body for proposed green industry projects In addition, issuer**Error! Bookmark not defined.**: • shall disclose other documents required by the Exchange • is encouraged to, on annual basis, disclose to market assessment opinion or certification report by independent professional assessment or certification institutions	
Requirements for external verifier	Verification provider(s) are subject to accreditation	Independent assessment or certification should be issued by professional certification authority	Independent certification agencies shall have strong expertise and public credibility	Evaluation and certification institution shall act based on principles of independence, objectivity, fairness and standardization	Not specified
Management of proceeds	Issuer shall • track amounts allocated to Green Projects until amount equals the net proceeds • document allocation through formal internal process	Issuer shall establish specialized account to clearly track the management of proceeds			Not specified
Policy Documents (sources)	TEG Report, Proposal for an EU green bond standard, June 2019	The People's Bank of China Announcement No. 39 [2015] 中国人民银行公告〔2015〕第 39 号	Guidelines on Green Note of Non-Financial Enterprises, (March 17, 2017) 非金融企业绿色债务融资工具业务指引	Guiding Opinions of the China Securities Regulatory Commission on Supporting the Development of Green Bonds 中国证监会关于支持绿色债券发展的指导意见 Notice of Shenzhen Stock Exchange on the Pilot Project of Green Corporate Bond Business [2016] No. 206	Guidelines for Issuing Green Bonds 绿色债券发行指引

			深圳证券交易所关于 开展绿色公司债券业务试点的通知 深证上[2016]206 号 Notice on the Pilot Program of Green Corporate Bonds,[2016] No. 13 关于开展绿色公司债券试点的通知, 上证发〔2016〕13 号

Appendix 3: Full Taxonomy Comparison

Legend: Aligned, Not aligned, Partly aligned, partly not aligned, Partly aligned, partly unclear, Partly not aligned, partly unclear, Not clear if aligned

High level categories, Green Industry Catalogue	Mid-level categories, Green Industry Catalogue	Low-level categories, Green Industry Catalogue	Relation to proposed EU Taxonomy & Comments
1 Energy-saving and environmental protection industry	1.1 manufacture of high-efficiency energy-saving equipment	1.1.1 Energy-saving boiler manufacturing 1.1.2 Energy-saving kiln manufacturing 1.1.3 Energy-saving pump and vacuum equipment manufacturing 1.1.4 Energy-saving gas compression equipment manufacturing 1.1.5 Energy-saving hydraulic pressure component manufacturing 1.1.6 Energy saving fan manufacturing 1.1.7 High-efficiency generator and generator set manufacturing 1.1.8 Energy-saving motor manufacturing 1.1.9 Energy-saving transformer, rectifier, inductor and electric welder manufacturing 1.1.10 Residual heat and residual gas utilization equipment manufacturing 1.1.11 Energy efficient household appliance manufacturing 1.1.12 High-efficiency energy-saving commercial equipment manufacturing 1.1.13 High-efficiency lighting products and system manufacturing 1.1.14 Green building materials manufacturing 1.1.15 Energy metering, monitoring, control equipment manufacturing	Contributing to: • climate change mitigation (except 1.1.1 & 1.1.2)
	1.2 advanced environmental protection equipment manufacturing	1.2.1 Water pollution prevention equipment manufacturing 1.2.2 Air pollution prevention equipment manufacturing 1.2.3 Soil pollution control and repair equipment manufacturing 1.2.4 Solid waste treatment and disposal equipment manufacturing 1.2.5 Vibration and noise reduction equipment manufacturing 1.2.6 Radioactive pollution prevention and treatment equipment manufacturing 1.2.7 Environmental pollution treatment chemicals and materials manufacturing 1.2.8 Environmental monitoring equipment and emergency treatment equipment manufacturing	Contributing to: • circular economy including waste prevention and recycling (1.2.4) • pollution prevention and control (all others) Comment: "greening by" activities (manufacturing of equipment and other technologies that contribute to goals). However, EU Taxonomy does not yet provide confirmation which activities under the goals defined here are "greening by".
	1.3 resource recycling equipment manufacturing	1.3.1 Mineral resources comprehensive utilization equipment manufacturing 1.3.2 Industrial solid waste comprehensive utilization equipment manufacturing 1.3.3 Construction waste, road waste recycling and harmless utilization equipment manufacturing 1.3.4 Kitchen waste resource-based and harmless utilization equipment manufacturing 1.3.5 Automobile parts and electromechanical products remanufacturing equipment manufacturing 1.3.6 Resource recycling equipment manufacturing 1.3.7 Unconventional water source utilization equipment manufacturing 1.3.8 Agricultural and forestry waste resource utilization harmless utilization equipment manufacturing 1.3.9 Urban Wastewater Treatment Plant Sludge Disposal Comprehensive Utilization Equipment Manufacturing	Contributing to: • circular economy including waste prevention and recycling (all other than 1.3.7) • sustainable use and protection of water and marine resources (1.3.7) Comment: "greening by" activities (manufacturing of equipment and other technologies that contribute to goals). However, EU Taxonomy does not yet provide confirmation which activities under the goals defined here are "greening by".
	1.4 new energy vehicles and green ships manufacturing	1.4.1 New energy vehicle key parts manufacturing and industrialization 1.4.2 Charging, power exchange and hydrogenation facility manufacturing, 1.4.3 Green Shipbuilding	Contributing to: climate change mitigation (except some activities in 1.4.3)
	1.5 improving energy efficiency	1.5.1 Energy-saving renovation and energy efficiency improvement of boiler (kiln) 1.5.2 Energy efficiency improvement of motor system 1.5.3 Residual heat and residual pressure utilization 1.5.4 Energy system optimization 1.5.5 Green lighting transformation 1.5.6 Energy efficiency improvement of turbo-generator system	Contributing to: • climate change mitigation (all)
	1.6 pollution control	1.6.1 Good Water Body Protection and Groundwater Environment Prevention and Control	Contributing to:

		1.6.2 Water Environment Treatment in Key Basin Waters 1.6.3 Urban Black and Odor Water Body Remediation 1.6.4 Ship Port Pollution Prevention and Control 1.6.5 Traffic Vehicle Pollution Control 1.6.6 City Dust Comprehensive Remediation 1.6.7 Catering fume pollution control 1.6.8 Construction land pollution control 1.6.9 Non-point source pollution control of agriculture, forestry and grassland 1.6.10 Desert pollution control 1.6.11 Agricultural land pollution control 1.6.12 Noise pollution control 1.6.13 Odor pollution treatment, 1.6.14 Rural residential environment rectification	• sustainable use and protection of water and marine resources (1.6.1, 1.6.2, 1.6.3) • pollution prevention and control (the rest)
	1.7 resource recycling	1.7.1 Comprehensive utilization of mineral resources 1.7.2 Recycling of waste resources 1.7.3 Comprehensive utilization of urban and rural domestic waste 1.7.4 Remanufacturing of auto parts and electromechanical products 1.7.5 Desalination treatment of seawater and brackish water 1.7.6 Collection, treatment and utilization of rainwater 1.7.7 Utilization of agricultural waste resources 1.7.8 Comprehensive utilization of sludge from municipal sewage treatment plants	Contributing to: • sustainable use and protection of water and marine resources (1.7.5, 1.7.6) • circular economy including waste prevention and recycling (all the other)
2 Cleaner production industry	2.1 green upgrading of industrial park	2.1.1 Circular transformation of industrial chain of the park 2.1.2 High-efficiency transformation of park resource utilization 2.1.3 Centralized reform of pollution control in the park 2.1.4 Clean production transformation of key industries in the park	Contributing to: • circular economy including waste prevention and recycling (2.1.1 and 2.1.2) • pollution prevention and control (2.1.3 and 2.1.4)
	2.2 alternative use of non-toxic and harmless raw materials and hazardous waste treatment	2.2.1 Production and substitution of non-toxic and harmless raw materials 2.2.2 Treatment and disposal of hazardous wastes 2.2.3 Transportation of hazardous wastes 2.2.4 Production and replacement of high-efficiency, low-toxicity and low-residue pesticides	Contributing to: • circular economy including waste prevention and recycling (2.2.1) • pollution prevention and control (all others)
	2.3 comprehensive treatment of waste gas , disposal and resource utilization in production process	2.3.1 Industrial desulfurization, denitrification and dust removal 2.3.2 Ultra-low emission modification of coal-fired power plants 2.3.3 Comprehensive remediation of volatile organic compounds 2.3.4 Ultra-low emission modification of iron and steel enterprises	Contributing to: • pollution prevention and control (all) Comment: Allow lower pollutant emissions which clearly contributes to "pollution prevention and control" goal by “improving levels of air, water or soil quality in areas in which economic activity takes place” but activities can continue having (significant) emissions at least in form of greenhouse gases (as fossil fuel using activities are incl.). However, they likely do not prolong the lifetime of the asset and thus not "lock in" emissions in long term.
	2.4 water saving, treatment and disposal of waste water	2.4.1 Water-saving and efficient use of water resources in the production process 2.4.2 Water pollution control in key industries 2.4.3 Centralized water pollution control in industrial agglomeration areas 2.4.4 Livestock and poultry breeding waste pollution control	Contributing to: • sustainable use and protection of water and marine resources (2.4.1) • pollution prevention and control (All others) Comment: Allow lower pollutant emissions to water and sustainable use of water resources but activities can continue having (significant) other emissions (to air and/or soil). However, activities do not likely prolong the lifetime of the asset and thus not "lock in" these other possible emissions in long term.
	2.5 comprehensive utilization of resources, treatment and	2.5.1 Industrial solid waste harmless treatment and comprehensive utilization 2.5.2 Historical legacy tailings pond remediation 2.5.3 Packaging waste recycling treatment 2.5.4 Waste agricultural film recycling use	Contributing to: • protection and restoration of biodiversity and ecosystems (2.5.2)

	disposal of waste residue in production process		• circular economy including waste prevention and recycling (all others)
3 Clean energy industry	3.1 manufacture of new energy and clean energy equipment	3.1.1 Wind Power Equipment Manufacturing 3.1.2 Solar Power Equipment Manufacturing 3.1.3 Biomass Energy Equipment Manufacturing 3.1.4 Hydropower and Pumped Storage Equipment Manufacturing 3.1.5 Nuclear Power Equipment Manufacturing 3.1.6 Unconventional oil and gas exploration and mining equipment manufacturing 3.1.7 Marine oil and gas exploration equipment manufacturing 3.1.8 Smart grid product and equipment manufacturing 3.1.9 Gas turbine equipment manufacturing 3.1.10 Fuel cell equipment manufacturing 3.1.11 Geothermal energy development and utilization equipment manufacturing 3.1.12 Marine Energy Development and Utilization Equipment Manufacturing	Contributing to: • climate change mitigation (except 3.1.5, 3.1.6, 3.1.7 & 3.1.9)
	3.2 construction and operation of clean energy facilities	3.2.1 Construction and operation of wind power facilities 3.2.2 Construction and operation of solar energy utilization facilities 3.2.3 Construction and operation of biomass energy utilization facilities 3.2.4 Construction and operation of large-scale hydropower facilities 3.2.5 Nuclear power plants Construction and operation 3.2.6 Construction and operation of coalbed methane (coal gas) extraction and utilization facilities 3.2.7 Construction and operation of geothermal energy utilization facilities 3.2.8 Construction and operation of marine energy utilization facilities 3.2.9 Construction and operation of hydrogen energy utilization facilities 3.2.10 Construction and operation of heat pump facilities	Contributing to: • climate change mitigation (except 3.2.5. & 3.2.6)
	3.3 clean and efficient utilization of conventional energy sources	3.3.1 Clean fuel production 3.3.2 Clean coal utilization 3.3.3 Clean coal production	Contributing to: NA
	3.4 efficient operation of energy systems	3.4.1 Multi-energy complementary project construction and operation 3.4.2 Construction and operation of high-efficiency energy storage facilities 3.4.3 Smart grid construction and operation 3.4.4 Coal-fired generator set peaking flexibility reconstruction project and operation 3.4.5 Construction and operation of natural gas transmission, storage, transportation and peaking facilities 3.4.6 Construction and operation of distributed energy projects 3.4.7 Construction and operation of pumped storage power stations	Contributing to: • climate change mitigation (except 3.4.4, 3.4.5)
4 Eco-environmental industry	4.1 ecological agriculture	4.1.1 Protection of Modern Agricultural Seed Industry and Animal and Plant Germplasm Resources 4.1.2 Green Organic Agriculture 4.1.3 Crop Planting Protected Area, Protected Area Construction and Operation 4.1.4 Forest Resources Cultivation Industry 4.1.5 Undergrowth Planting and Forest undergrowth industry 4.1.6 Carbon sinking, planting trees and forest seedlings and flowers 4.1.7 Protection of forestry genetic resources 4.1.8 Green animal husbandry 4.1.9 Green fishery 4.1.10 Forest recreation and recreation industry 4.1.11 Green control of crop pests and diseases	Contributing to: • pollution prevention and control (4.1.2, 4.1.11) • protection and restoration of biodiversity and ecosystems (4.1.1, 4.1.3, 4.1.4, 4.1.5, 4.1.7, 4.1.9, 4.1.10) • circular economy including waste prevention and recycling (4.1.8, 4.1.9) • climate change mitigation (4.1.6)
	4.2 ecological protection	4.2.1 Protection of natural forest resources 4.2.2 Protection of animal and plant resources 4.2.3 Construction and operation of nature reserves 4.2.4 Construction, maintenance and operation of ecological functional areas 4.2.5 National parks, world heritage sites, national scenic spots, Protective operations such as national forest parks, national geological parks, and national wetland parks	Contributing to: • protection and restoration of biodiversity and ecosystems (all)
	4.3 ecological restoration	4.3.1 Returning farmland to forests and grassland and returning grazing land to the grassland construction 4.3.2 Restoration of rivers and lakes and wetlands protection 4.3.3 Propagation and release and marine pasture construction and operation 4.3.4 National ecological security barrier protection and restoration 4.3.5 Comprehensive Management of Key Ecological Areas 4.3.6 Restoration of Mine Ecological Environment	Contributing to: • protection and restoration of biodiversity and ecosystems (4.3.1, 4.3.2, 4.3.4, 4.3.5, 4.3.6, 4.3.7, 4.3.8) • sustainable use and protection of water and marine resources (4.3.3, 4.3.9, 4.3.10, 4.3.13)

		4.3.7 Integrated Management of Desertification, Rocky Desertification and Soil and Water Loss 4.3.8 Prevention and Control of Pest Disasters 4.3.9 Prevention and Control of Drought and Flood Disasters in Water Ecosystems 4.3.10 Groundwater Super Mining area management and restoration 4.3.11 Comprehensive management of coal mining subsidence area 4.3.12 Comprehensive improvement of rural land 4.3.13 Comprehensive improvement of sea area, coastal zone and island	
5 Green upgrading of infrastructure	5.1 building energy efficiency and green building	5.1.1 Ultra Low Energy Building Construction 5.1.2 Green Building 5.1.3 Building Renewable Energy Application 5.1.4 Prefabricated Building 5.1.5 Existing Building Energy Saving and Greening Transformation 5.1.6 Logistics Green Warehousing	Contributing to: • climate change mitigation (all)
	5.2 green transportation	5.2.1 Construction and operation of toll collection system 5.2.2 Construction of port, dock shore power facilities and airport bridge power supply facilities 5.2.3 Construction and operation of container multimodal transport system 5.2.4 Intelligent transportation system construction and operation 5.2.5 Construction and operation of charging, power exchange, hydrogenation and gas filling facilities 5.2.6 Construction and operation of urban slow-moving systems 5.2.7 Construction and operation of urban and rural public transportation systems 5.2.8 Construction and operation of shared transportation facilities 5.2.9 Construction and operation of road drop-and-hook transportation system 5.2.10 Freight transportation railway construction and operation and railway energy conservation and environmental protection transformation	Contributing to: • climate change mitigation (most)
	5.3 environmental infrastructure	5.3.1 Construction and operation of sewage treatment, recycling and sludge treatment and disposal facilities 5.3.2 Construction and operation of domestic garbage treatment facilities 5.3.3 Construction and operation of environmental monitoring system 5.3.4 Inspection and reconstruction of urban sewage collection system 5.3.5 Construction and operation of district measurement and leakage control of urban water supply network 5.3.6 Inspecting and renovating the sewage outfall into the river and standardizing the construction and operation	Contributing to: • pollution prevention and control (5.3.3) • circular economy including waste prevention and recycling (5.3.2) • sustainable use and protection of water and marine resources (all others)
	5.4 urban energy infrastructure	5.4.1 Clean Operation, Operation and Reconstruction of Urban Central Heating System 5.4.2 Intelligent Construction, Operation and Reconstruction of Urban Power Facilities 5.4.3 Construction and Operation of Integrated Urban Energy Integration Facilities	Contributing to: • climate change mitigation (all)
	5.5 sponge city	5.5.1 Sponge Building and Community Construction and Operation 5.5.2 Sponge Road and Square Construction and Operation 5.5.3 Sponge Park and Green Space Construction and Operation 5.5.4 Urban Drainage Facilities Standard Operation, Operation and Reconstruction 5.5.5 Urban water body natural ecological restoration	Contributing to: • protection and restoration of biodiversity and ecosystems (5.5.5) • sustainable use and protection of water and marine resources (all others)
	5.6 green landscapes	5.6.1 Park Green Space Construction, Maintenance and Operation 5.6.2 Greenway System Construction, Maintenance Management and Operation 5.6.3 Auxiliary Green Space Construction, Maintenance Management and Operation 5.6.4 Road Greening Construction and Maintenance Management 5.6.5 Regional Green Space Construction, maintenance management and operation 5.6.6 Three-dimensional greening construction, maintenance management	Contributing to: • protection and restoration of biodiversity and ecosystems (most closely related to this goal)
6 Green service	6.1 environmental consulting services	6.1.1 Green industry project survey services 6.1.2 Green industry project plan design services 6.1.3 Green industry project technical consulting services 6.1.4 Clean production audit services	Contributing to: several goals
	6.2 environmental project operation management	6.2.1 Energy Management System Construction 6.2.2 Contract Energy Management Services 6.2.3 Energy Rights Trading Services 6.2.4 Water Rights Trading Services 6.2.5 Sewage Licensing and Trading Services 6.2.6 Carbon Emission Trading Services 6.2.7 Power Demand Side Management Services 6.2.8 Renewable Energy Green Card Trading Service	
	6.3 project evaluation,	6.3.1 Energy Conservation Assessment and Energy Audit 6.3.2 Environmental Impact Assessment	

	audit and verification	6.3.3 Carbon Emissions Verification 6.3.4 Geological Hazard Assessment 6.3.5 Soil and Water Conservation Assessment
	6.4 monitoring and testing	6.4.1 Construction of energy online monitoring system 6.4.2 Pollution source monitoring 6.4.3 Environmental damage assessment monitoring 6.4.4 Environmental impact assessment monitoring 6.4.5 Enterprise environmental monitoring 6.4.6 Ecological environment monitoring
	6.5 technical product certification and promotion	6.5.1 Promotion of energy-saving product certification 6.5.2 Low-carbon product certification promotion 6.5.3 Water-saving product certification promotion 6.5.4 Environmental label product certification promotion 6.5.5 Organic food certification promotion 6.5.6 Green food certification promotion 6.5.7 Resource synthesis Use product certification to promote 6.5.8 green building materials certification promotion

Appendix 4: Taxonomy Comparison – Unclear alignment

Legend: Not clear if aligned, Partly aligned, partly unclear, Partly not aligned, partly unclear

Green Industry Catalogue categories	Low-level categories, Green Industry Catalogue	Relation to proposed EU Taxonomy
1 Energy-saving and environmental protection industry 1.1 manufacture of high-efficiency energy-saving equipment	1.1.7 High-efficiency generator and generator set manufacturing	1.1.7: Incl. aligned "greening by" activities (that align with "21.1Manufacture of Low carbon technologies") but also e.g. high efficiency combustion engine manufacturing, among others, which could allow promotion of fossil fuel based technology manufacturing.
1.2 advanced environmental protection equipment manufacturing	1.2.6 Radioactive pollution prevention and treatment equipment manufacturing	1.2.6: EU Taxonomy does not include reference to radioactive pollution but refers to e.g. "preventing or reducing pollutant emissions into air, water or land other than greenhouse gases" as eligible activity. The main source of radioactive pollution, nuclear energy, is not seen as a green activity by EU Taxonomy at present, and thus it is unclear if this category aligns. Also, EU Taxonomy does not yet provide confirmation which activities under "pollution prevention and control" goal are "greening by"
1.3 resource recycling equipment manufacturing	1.3.1 Mineral resources comprehensive utilization equipment manufacturing 1.3.8 Agricultural and forestry waste resource utilization harmless utilization equipment manufacturing	1.3.1 & 1.3.8: incl. activities contributing to "circular economy including waste prevention and recycling" goal that could be viewed as "greening by" activities if such will later on be defined as eligible. Currently "greening by" activities refer only to climate change mitigation and adaptation activities. However: 1.3.1: incl. also comprehensive utilization equipment manufacturing for "energy minerals" which could incl. equipment for fossil fuels extraction and lead to greenhouse gas emissions, and these would most likely not align. 1.3.8: EU Taxonomy position to biomass use is not clear as "use of biomass for energy requires trade-off decisions relative to other potential uses and across mitigation activities, but also for do no significant harm dimensions"
1.6 pollution control	1.6.5 Traffic Vehicle Pollution Control 1.6.13 Odor pollution treatment, 1.6.14 Rural residential environment rectification	1.6.5: incl., among other, replacement of old vehicles with new efficient and environmentally friendly ones (to prevent or reduce pollutant emissions) but does not specify carbon emission limits for these new vehicles (EU Taxonomy "24.5 Passenger cars and commercial vehicles") 1.6.13: Odor is not is not mentioned in EU taxonomy as air pollution source specifically. 1.6.14: incl. "village appearance improvement" as one activity among other which is not clearly aligned with EU taxonomy as EU Taxonomy does not incl. activities that could be viewed as social aspects (at least at the moment)
1.7 resource recycling	1.7.1 Comprehensive utilization of mineral resources	1.7.1: Improves utilization efficiency of minerals but incl. coal, gas and oil excavation (among other minerals) and these can contribute to fossil fuel supply continuing (see 3.1.6 in Table 7)
2 Cleaner production industry 2.1 green upgrading of industrial park	2.1.2 High-efficiency transformation of park resource utilization 2.1.4 Clean production transformation of key industries in the park	2.1.2: promotes comprehensive use of e.g. coalbed methane, and coal gangue, which can contribute to circular economy but can also be used as further greenhouse gas (and other pollutant) emitting source (see 3.1.6 in Table 7) 2.1.4: "clean" remains rather vague concept even in specific description of category (there is, however, reference to standards that should be used to define it, but this Thesis work did not expand to analysing those)
2.2 alternative use of non-toxic and harmless raw materials and hazardous	2.2.3 Transportation of hazardous wastes	2.2.3: Vague category as transport of hazardous waste separate from category "2.2.2 Treatment and disposal of hazardous wastes" seems unnecessary.

waste treatment		
Green Industry Catalogue categories	**Low-level categories, Green Industry Catalogue**	**Relation to proposed EU Taxonomy**
3 Clean energy industry 3.1 manufacture of new energy and clean energy equipment	3.1.3 Biomass Energy Equipment Manufacturing	3.1.3: EU Taxonomy position to biomass use is not clear as "use of biomass for energy requires trade-off decisions relative to other potential uses and across mitigation activities, but also for do no significant harm dimensions"
3.4 efficient operation of energy systems	3.4.1 Multi-energy complementary project construction and operation 3.4.5 Construction and operation of natural gas transmission, storage, transportation and peaking facilities 3.4.6 Construction and operation of distributed energy projects	3.4.1 & 3.4.6: quite vaguely defined categories and further descriptions, and thus it is hard to distinguish alignment 3.4.5: Construction and operation of natural gas transmission and transportation and storage facilities are highly likely not eligible as "Gas network expansion is not eligible" under EU Taxonomy and only "Retrofit of gas transmission and distribution networks whose main purpose is the integration of hydrogen and other low-carbon gases" is eligible. Construction and operation of natural gas peaking facilities is only eligible for some period if it meets emission thresholds (for Production of Electricity from Gas Combustion, Cogeneration of Heat/cool and Power from Gas Combustion, Production of Heat/cool from Gas Combustion) which reduce every 5 years in line with an EU trajectory to net-zero CO2e in 2050. It is not clear based on Green Industry Catalogue, if such thresholds are met.
4 Eco-environmental industry 4.1 ecological agriculture	4.1.10 Forest recreation and recreation industry	4.1.10: activity can be viewed as socially sustainable activity but it is somewhat unclear if projects with sole social focus can be viewed "green" in EU Taxonomy (see 1.6.14)
5 Green upgrading of infrastructure 5.1 building energy efficiency and green building	5.1.2 Green Building 5.1.4 Prefabricated Building 5.1.6 Logistics Green Warehousing	5.1.2, 5.1.4 & 5.1.6: vaguely defined activities. There is, however, reference to standards that should be used to define the category, but this Thesis work did not expand to analysing those.
5.2 green transportation	5.2.1 Construction and operation of toll collection system 5.2.2 Construction of port, dock shore power facilities and airport bridge power supply facilities 5.2.3 Construction and operation of container multimodal transport system 5.2.7 Construction and operation of urban and rural public transportation systems 5.2.9 Construction and operation of road drop-and-hook transportation system	5.2.1, 5.2.2, 5.2.3 & 5.2.9: EU Taxonomy supports construction and operation of infrastructure for low carbon transport (under "24.4. Infrastructure for low carbon transport"). None of these categories clearly fall under these and do not clearly require that the fleet for which the transport infra is built needs to be zero or low carbon. 5.2.7: EU Taxonomy (under "24.3 Public transport") promotes zero direct emissions land transport activities and other low carbon fleet until 2025 (non-eligible thereafter). It is unclear if these Green Industry Catalogue categories are aligned (based on detailed description of category): "renovation and operation of urban and rural bus roads and purchase of bus vehicles". Whereas "construction and operation of rapid rail transit such as urban light rail and underground railway" can be viewed as aligned.
5.4 urban energy infrastructure	5.4.1 Clean Operation, Operation and Reconstruction of Urban Central Heating System 5.4.2 Intelligent Construction, Operation and Reconstruction of Urban Power Facilities 5.4.3 Construction and of Integrated Urban Energy Integration Facilities Operation	5.4.1: For most activities listed in detailed description of the category the alignment is not sure as activities could potentially incl. fossil fuel use with lock-in and other risks. Construction and operation of low-grade industrial waste heat heating system (one activity among others) should be aligned as waste heat is seen green in the EU Taxonomy[23]. 5.4.2 & 5.4.3: categories vaguely defined and thus it is hard to distinguish alignment (could e.g. incl. fossil fuels utilization)

[23] "Operation of waste heat infrastructure is eligible because the emissions from the underlying economic activity would be generated with or without the waste heat recovery system. Hence the waste heat recovery system would not increase operational emissions." (TEG, 2019b, p. 291)

Green Industry Catalogue categories	Low-level categories, Green Industry Catalogue	Relation to proposed EU Taxonomy
5.6 green landscapes	5.6.1 Park Green Space Construction, Maintenance and Operation 5.6.2 Greenway System Construction, Maintenance Management and Operation 5.6.3 Auxiliary Green Space Construction, Maintenance Management and Operation 5.6.4 Road Greening Construction and Maintenance Management 5.6.5 Regional Green Space Construction, maintenance management and operation 5.6.6 Three-dimensional greening construction, maintenance management	all: There is no specification for the reason why green landscapes should be constructed, managed, maintained and operated (if for biodiversity, social/community needs, carbon sink purposes etc.). EU Taxonomy focus is on environmental sustainability and landscaping for social purposes is at least at present not in the focus.

Green Industry Catalogue categories	Low-level categories, Green Industry Catalogue	Relation to proposed EU Taxonomy
6 Green service 6.1 environmental consulting services	6.1.1 Green industry project survey services 6.1.2 Green industry project plan design services 6.1.3 Green industry project technical consulting services 6.1.4 Clean production audit services	All: Proposal for EU Green Bond Standard (TEG, 2019a) specifies: "Green Projects can include green assets and green expenditures that contribute to improving and maintaining the value of such green assets". Furthermore, green assets can be tangible or intangible and can include the share of working capital that can reasonably be attributed to their operation. Green expenditures can include any Capex and selected Opex such as maintenance costs related to green assets, that either increases the lifetime or the value of the assets, and research and development costs. Opex (such as purchasing costs and leasing costs) would only be eligible in specific and/or exceptional cases. From this, it can be interpreted that intangible assets could be incl. some services, and selected Opex as green expenditures in some cases can be seen to allow some services as green activities. Aligned with this, EU Taxonomy defines some climate change adaptation related services as eligible ("32.1 Research and development (natural sciences and engineering)" "32.2 Engineering activities and related technical consultancy dedicated to adaptation to climate change") For climate change mitigation at least "Data-driven solutions for greenhouse gas emission reductions are considered to make a substantial contribution to climate change mitigation because of the emissions reductions they enable". Also, based on an article by e.g. Bloomberg (Pronina, 2019) some international green bond definitions include for example communications and information technology, which further supports that some services could be viewed as eligible activities. Categories in Green Industry Catalogue include operational, technical, ICT and R&D types of consulting and/or R&D activities. Within the categories these are mostly mixed with e.g. audit, legal, operational, financial, permit application and training consulting services related to environmental projects. There is no specification on how the proceeds of green bonds are related to these activities and thus it is hard to make alignment judgement with EU Taxonomy. More specifically, the activities could be viewed either as 1) intangible assets that are financed by green bond proceeds (thus proceeds would be used to finance environmental service companies such as audit providers or ICT developers) or 2) as targets of proceeds spending (green assets using proceeds to e.g. pay for purchasing costs of audit services). From the EU Taxonomy perspective, the first case could be eligible whereas the second not. Thus, there is supporting evidence that some services could be considered as green activities by both Taxonomies but it remains unclear as the Green Industry Catalogue does not clearly specify on specific use of proceeds rules and similarly the EU rules are not very clear yet.
6.2 environmental project operation management	6.2.1 Energy Management System Construction 6.2.2 Contract Energy Management Services 6.2.3 Energy Rights Trading Services 6.2.4 Water Rights Trading Services 6.2.5 Sewage Licensing and Trading Services 6.2.6 Carbon Emission Trading Services 6.2.7 Power Demand Side Management Services 6.2.8 Renewable Energy Green Card Trading Service	
6.3 project evaluation, audit and verification	6.3.1 Energy Conservation Assessment and Energy Audit 6.3.2 Environmental Impact Assessment 6.3.3 Carbon Emissions Verification 6.3.4 Geological Hazard Assessment 6.3.5 Soil and Water Conservation Assessment	
6.4 monitoring and testing	6.4.1 Construction of energy online monitoring system 6.4.2 Pollution source monitoring 6.4.3 Environmental damage assessment monitoring 6.4.4 Environmental impact assessment monitoring 6.4.5 Enterprise environmental monitoring 6.4.6 Ecological environment monitoring	
6.5 technical product certification and promotion	6.5.1 Promotion of energy-saving product certification 6.5.2 Low-carbon product certification promotion 6.5.3 Water-saving product certification promotion 6.5.4 Environmental label product certification promotion 6.5.5 Organic food certification promotion 6.5.6 Green food certification promotion 6.5.7 Resource synthesis Use product certification to promote 6.5.8 green building materials certification promotion	